

# THE IRON AGE

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## A Reconstructed Russian Blast Furnace

How American Designs Have Made  
a New Plant Out of an Old One—  
Important Points on Stock Distribution

The following article, which is a translation of a contribution in Russian from V. Y. Grebenikoff, describes the reconstructed No. 2 furnace of the Nicopol-Mariopol Mining & Metallurgical Company at Sartana, South Russia. The original design and construction of the plant was accomplished under the direction of a prominent American engineer, and much of the original equipment was obtained in this country. In the rebuilding of this furnace the former shell and columns were retained, as was also the existing skip bridge, all other portions of the stack being provided new. Besides a McKee top, much of the construction materials and equipment were furnished by American firms: the Variety Iron Works, Cleveland, Ohio; the Crock-er-Wheeler Company, Ampere, N. J.; the Cutler-Hammer Mfg. Company, Milwaukee, Wis., and others.

The Nicopol-Mariopol Company, though not the largest producer of iron and steel products in Russia, is among the most enterprising and best equipped. It is interesting to note that after a trial interval of over one year the company is reconstructing its No. 1 furnace on similar lines and that American concerns have similar construction pending for other Russian iron producing concerns, the successful operation of the initial installation being largely responsible for this. The translation follows:

The metallurgical industry of Southern Russia lately has been passing through a period of considerable expansion. The majority of the plants

have been reconstructed so as to obtain a larger and cheaper production and to satisfy the tremendous demand for pig iron. The Nicopol-Mariopol Company decided to thoroughly reconstruct furnace No. 2, which has not been in operation since 1902.

In view of the great interest and many novel features in the design of the new furnace, we give

below a description of it and the more important drawings. Simultaneously, for the sake of comparison, are also given data on the construction of the old furnace, the latter being all the more necessary since the old construction limited to a certain extent the designer of the new plant. The new furnace has been in operation since April 25, 1913.

It is designed for an average production of 280 tons of open-hearth pig iron per day; it is provided with four blast heaters of the Kennedy type with a heating surface of 33,491 sq. ft. each. The blowers were built by the Southwark Foundry & Machine Company, Philadelphia, Pa., in 1897, compound with condensers, the diameter of the steam cylinders being 40 in. and 75

in., and of the air cylinders 78 in., stroke 80 in. These blowers give 330 cu. ft. (9.4 cu. m.) of free air per revolution; the maximum pressure is 30 lb. per sq. in. Material used is South-Russian coke and ore from the Krivoy Rog region. The tabulated main dimensions of the furnace are:

Number of tuyeres.....	12
Diameter of tuyeres.....	150 mm
Number of columns.....	8
Upper diameter of the air regulation box.....	560 mm
Diameter of hearth.....	3600 mm



The Gas Outlets of the Blast Furnace, Two in Number, Unite at a Point Above the Top of the Skip Hoist and Communicate There with the Down Corner, Which is Hidden by the Nearer Gas Pipe

Hight of hearth from the theoretical line of the hearth level	2550 mm
Hight to center of tuyeres	2090 mm
Hight to center of slag tuyeres	1290 mm
Hight of bosh	4130 mm
Angle of bosh	75 deg. 5 min.
Diameter of belly	5800 mm
Hight of belly	1780 mm
Angle of stack	85 deg. 44 min.
Diameter of stack at the throat	4000 mm
Total hight of furnace from the theoretical line of the hearth level to the circular rim of the funnel B. of the cone	24,450 mm
Useful hight of furnace	22,200 mm
Total volume of furnace	406 cu. m
Useful volume of furnace	397 cu. m
Number of outlets	2
Diameter of outlets (inside)	1190 mm
Total surface of outlets (probably cross section)	2.22 sq. m
Diameter of the large bell	2750 mm
Diameter of the small bell	1170 mm
Stroke of large bell	700 mm
Stroke of small bell	600 mm
Volume of hopper	3.56 cu. m
Capacity of loading wagons	2.6 cu. m

One of the illustrations shows the old furnace as it was when it was at work for the last time. The brick lining of the hearth was thin, the brick being only 340 mm. (13.6 in.), and with clay work only 530 mm. (21.2 in.). The construction of the pig and slag tap holes cannot be called successful. It can be seen from the drawing, and has been proved by many accidents, that the furnace did not satisfy requirements as to safety from burning through, reliability of the work of the pig tap hole and convenience of attendance to it, nor easy control of the state and reliability of cooling. Among other things that happened may be mentioned the tremendous explosion of 1902 when three of the columns were blown out and the roof and walls of the casting house were destroyed.

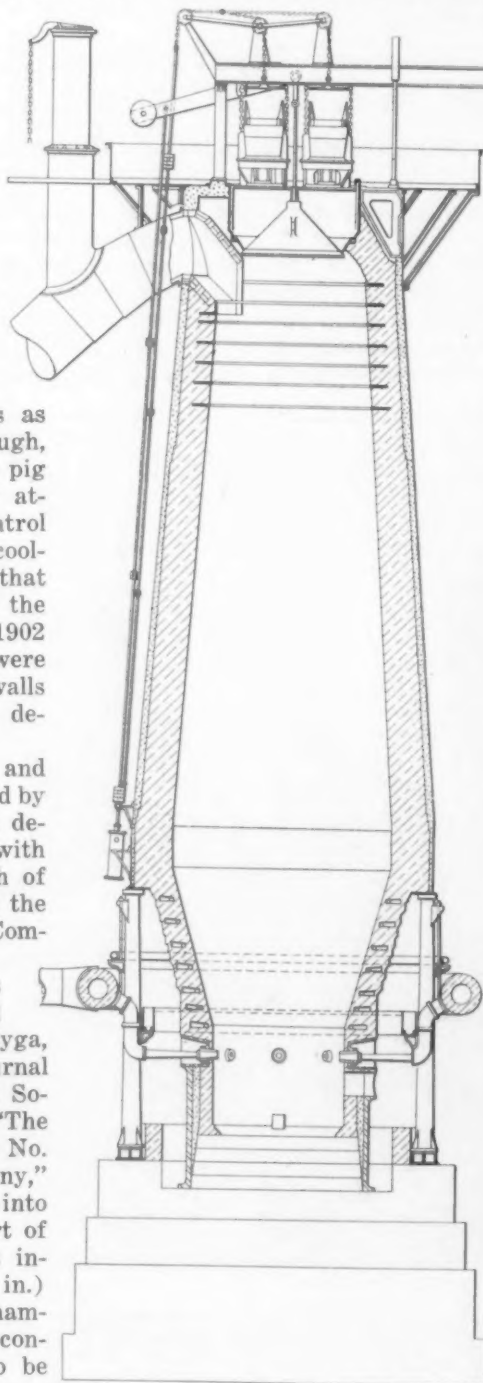
All these requirements, and many others, are fully satisfied by the new hearth of American design which has been tried out with uniform success in the South of Russia and in three units at the plant of the New Russia Company.

The advantages of this type are sufficiently explained in the article of V. I. Goolyga, mining engineer, in the Journal of the Russian Metallurgical Society, section I, 1912, p. 24, "The Blowing in of Blast Furnace No. 4 of the New Russia Company," and it is not necessary to go into further details as to this part of the furnace. The boshes as initially installed, 685 mm. (45 in.) thick, with bronze cooling chambers, of typical old American construction, were considered to be excessively complicated and expensive, and the design was adopted as the one which is more and more gaining ground with blast furnace engineers in Europe and America. It must be noticed, however, that this system is applicable only when the seams of the shell are perfectly strong and tight; this is not always borne in mind, and one meets on this account considerable trouble in practical work.

The old stack, of the usual Scotch type, supported by cast iron columns, was modified by the introduction of a system of cooling the entire lower part. The adopted design of a thin walled belly (up to half the hight) with external cooling (spray) and five belts of cooling pipe (iron pipe 1 1/4 in. dia.) cast-in in cast iron and laid in the brick work, each belt comprising 12 pipes, must up to a certain extent guarantee the permanency of shape of the furnace.

The brick work of the entire furnace was done in small size brick, made in Russia, giving the maximum of stability.

As a very serious problem in the design of a blast furnace, the rational construction of the throat must be considered. A well-designed automatic - charging plant, in addition to providing an absolutely correct distribution of materials in the throat, makes the working of a furnace absolutely independent from possible carelessness of employees, and at the same time reduces the labor cost of the operation.



Section of the Old Stack

#### Thickness of Brickwork

Top of stack	800 mm.
Bottom of stack	915
Cylindrical belly (thick part)	915
Cylindrical belly (thin part)	343
Boshes	343
Hearth, at the section of the axes of the tuyeres	750
Hearth, at the section of the pig tap hole	1000

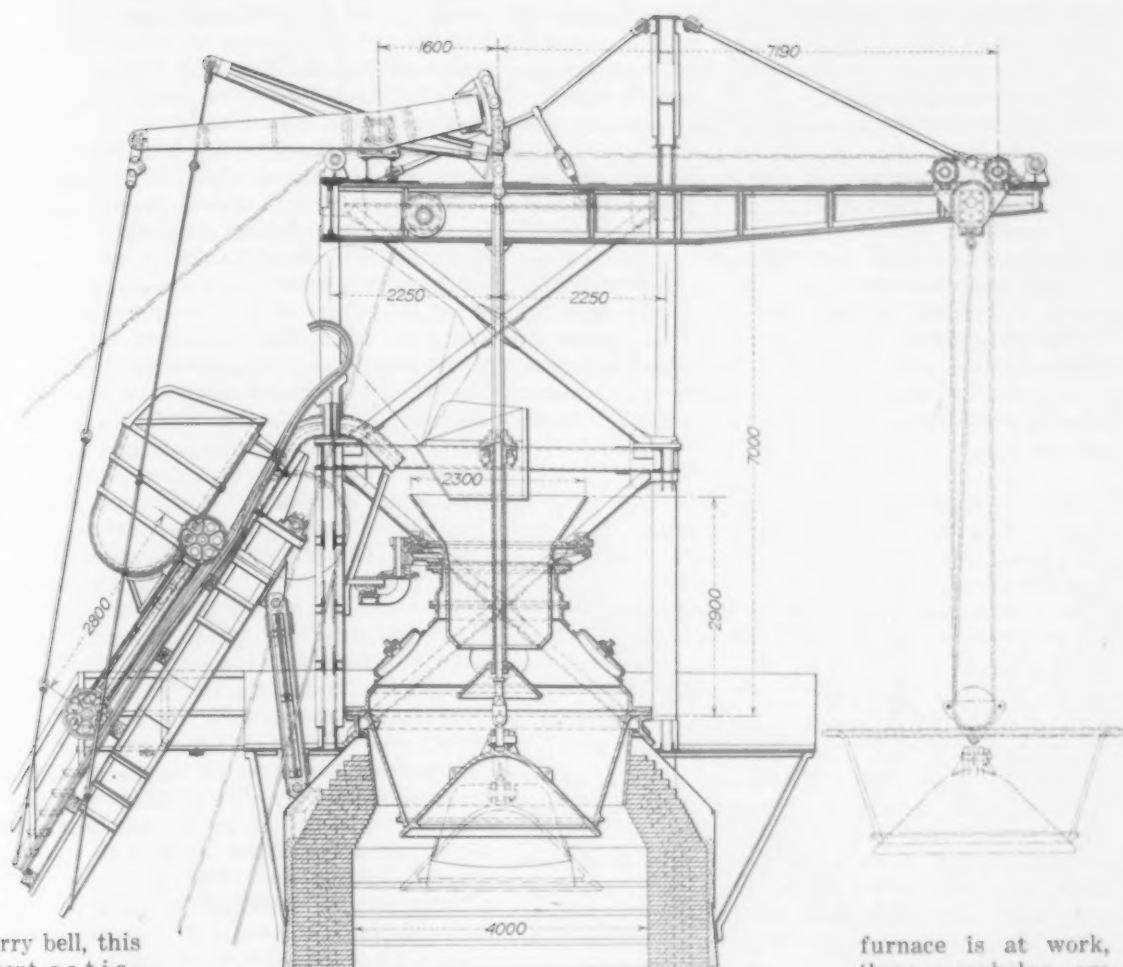
#### Thickness of Furnace Shell Plates

New part of the truncated conical part of the shell	14.0 mm.
Old shell at the top	9.5
Old shell in the middle	8.0
Old shell at the bottom	9.5 and 15.5
New belly and boshes	19.0
Hearth	25.0

The charging plant of the old furnace did not in practice do all that was expected of it, and the company endeavored to replace the old construction with a new one, retaining the feature of automatic operation as one too valuable to be discarded.

The old charging plant gave on the Parry hopper four separate heaps, the two front ones not analogous to the two rear ones neither as regards distribution of materials, nor as regards symmetry and regularity of position; this is easily explained as being due to the difference in the velocity of fall of various materials at different positions of the guide boards. Four heaps constitute a glaring discontinuity in the ring of materials along a large bell which causes an unequal operation of the furnace; this can be noticed especially in the work of the different tuyeres.

In selecting the new apparatus, the company decided to adopt, on the author's suggestion, the patent system of automatic charging of Engineer Arthur McKee, in use in a large number of American plants. This construction is shown in one of the illustrations from which it can be seen that the loading apparatus is provided with a double hopper

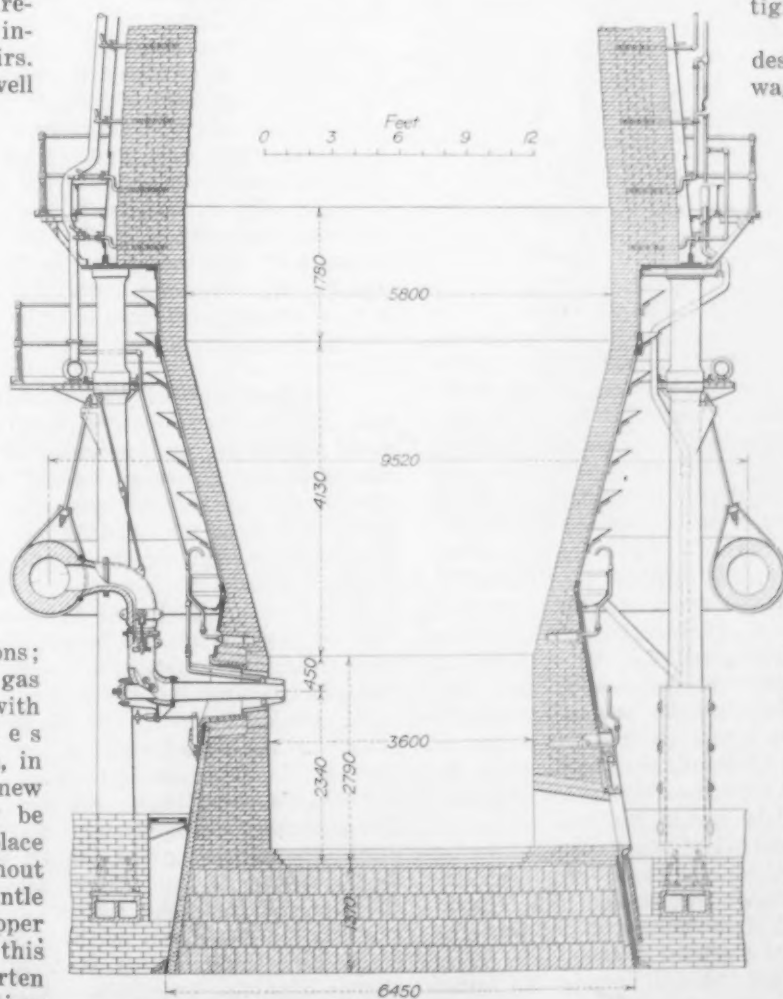


and a Parry bell, this arrangement satisfying the requirements of working, installation and repairs. Air-tightness as well as strength and reliability of the joints are fully secured which is not so with systems in which the loading cup is not rigidly connected with the jacket as in the old construction of the Nicopol-Mariopol furnace.

The lower hopper is designed for a load of coke up to 300 poods, a little less than 5 tons; it is covered by a gas seal provided with four manholes through which, in case of repairs, a new small bell may be brought in to replace the old one, without having to dismantle in any way the upper charging hopper; this is supposed to shorten materially the time of repairs. When the

furnace is at work, these manholes are tightly screwed down.

The top hopper, designed to take one wagon of coke (60 poods or approximately 1 gross ton) is supported by castings placed on the throat mantle; a flange connection is used on the castings which makes it possible, during installation or repair work, to take off and put on the entire hopper with its auxiliary mechanism in one operation. This hopper, as shown in an illustration, has in its upper part, a small funnel-shaped extension. In order to decrease the dimensions of the hopper, which are limited by the width of two charging wagons, a light iron construction, the so-called "guiding

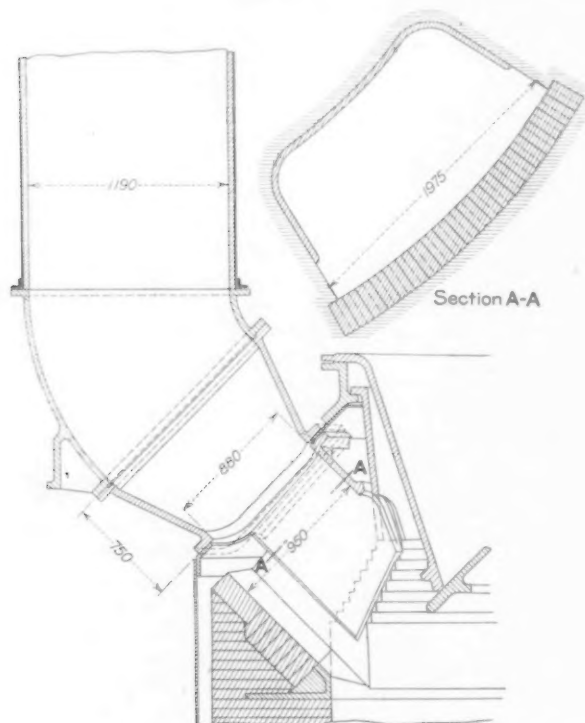


Top and Bottom of the Reconstructed Blast Furnace



hopper," has been adopted. This hopper has a wedge-shaped construction, catches by its opening both cars, retains the material from scattering sidewise when the cars are tipped, and, by its inclines, helps the more uniform fall into the top hopper.

The main advantage of the McKee hopper lies in its rotation. Supported on 110 steel balls,  $2\frac{1}{2}$  in. in diameter, placed in a circle under a supporting flange, the hopper is given a rotary motion by means of gear transmission, from an electric motor placed on the top of the furnace. Together with the hopper rotates also the small bell pressed against it; its rotation is facilitated by the provision of a ball bearing at the upper part of the rod. The mantle and cup are made of steel cast-



Detail of One of the Gas Outlets at the Throat of Stack

ings; the funnel-like expansion of the hopper, of cast iron.

The construction of the ball bearings is very simple, absolutely reliable and, by a special arrangement, is protected from being affected by foreign bodies getting into the ball race, such as bits of materials, dust, etc.; it answers its purpose so well that an empty hopper can be easily moved by one man. The air-tightness of the top connection when the large bell is down, is secured by means of a special flange ring. The governing of the bells is done by hand, by means of steam cylinders located in the casting house on the columns supporting the inclined bridge. For the small bell use was made of an old cylinder, 12 in. in diameter; for the large bell a new cylinder was made, 350 mm. (14 in.) in diameter. This cylinder produces a positive closing of the bell free from shocks, the smoothness of the closing operation being secured by means of very simple valves automatically holding-off the exhaust of the steam into the atmosphere and thus making unnecessary the use of buffers.

The most essential part of the McKee automatic charging system is the cycle of delivery and distribution of materials at the throat. The fundamental idea of the distribution is as follows: the charging is done by repeated cycles. The cycle may be selected for four or six charges, the latter being used in the present case. Each charge consists of ten cars, out of which four are coke, 240

poods (about 6 tons) each, and six, ore and fluxes. The large bell is lowered twice, once for the coke and once for the ore and fluxes. It would have been better to divide the charge into batches of six cars each, but the capacity of the hoisting engine did not permit of taking less than 10 cars. The small bell is lowered after the tipping of each car.

The first charge passes from the small bell to the large one without the hopper being rotated. After receiving one car load from the next charge, the hopper together with the closed small bell and the material in it, turns through 60 deg., after which the small bell is lowered. All of the 10 cars of the second charge pass in the same manner. In the third charge the same occurs, with a turn through 120 deg., in the fourth through 180 deg., in the fifth through 240 deg., and in the sixth through 300 deg. The cycle is then resumed from the beginning in the same way.

On the throat the following machinery is installed: a 10-hp. motor taking care of the distributing hopper; a brake which instantly stops the motor when the hopper has reached the position at which the small bell must be opened, and a periodically acting knife-switch of the enclosed type connected with the shaft rotating the main hopper.

With the shaft of the hoisting engine is connected a switch which closes the current whenever the charging car takes an up-turned position at the top of the furnace. The arrangement is such as to provide for a certain leeway for the car for lubrication, inspection and repairs, without affecting the cycle of distribution. The valve gear of the steam cylinder of the small bell (located in the hoisting engine house) is provided with a solenoid which cuts off the admission of steam in such a way that the small bell cannot be opened until the hopper completes its turn.

At the foot of the inclined bridge, in full view of the engineer, is placed the switchboard provided with seven automatically cut-in and out lamps, by means of which the engineer can see when the hopper is in motion, and where the charge goes. The main switchboard carries all the apparatus necessary for automatically starting and stopping the motor actuating the distributing hopper of the throat, and for closing the small bell and the current in the signaling lamps; it is placed at the engine in a special location which is kept locked; the starting rheostat of the motor is in the same place.

The operation of the above devices may be summed up in the following manner: as soon as the main switch on the switchboard is closed by the action of the hoisting engine, the further evolution of the cycle is entirely automatic, governed by the action of the hoisting engine, but independent of the control of the engineer operating that engine. When the car loaded at the foot of the hoist comes to the top of the furnace, the periodically acting switch (at the engine) closes, and sets into action the solenoid at the valve gear, thus effectually closing the small bell and protecting it from opening too soon. At the same time the main switch on the switchboard is thrown over, thus releasing the brake and gradually starting the distributing hopper. After the hopper, together with the small bell, turns through a certain part of the circle, the switch on the throat, which is actuated by the motion of the hopper, automatically cuts off the current from the motor, sets the brake and releases the valve gear of the steam cylinder of the small bell, thus making it possible to lower the charge onto the large bell. After this the entire apparatus remains motionless until the next loaded car reaches the top of the furnace, when the oper-



ation is repeated in the same order as before for the next car.

The catching of the gases is effected from two sides, instead of the former system of using one outlet. Owing to the conical shape of the upper part of the furnace jacket, the gas outlets approach somewhat the center of the furnace which unites to a certain extent the central and lateral systems of gas conduction. The system of gas outlets reproduced in the illustrations is provided with two "lights" with covers which replace all safety valves, the diameter of large gas outlets and the dust-catcher being considered as part of the buffer.

Particular attention is due to the construction of the gas outlets in the throat as shown in one of the illustrations which secures lack of loss of useful height of furnace usually caused by lateral outlets; further, the use of a cast armature protects the brickwork from the injurious influence of the constituents in the mixture of ores and fluxes, and finally, their considerable width facilitates a correct distribution of the gases.

The adopted system of having a number of bends above the throat, prevents the materials in the furnace from getting into the gas outlets and dust-catcher, and reduces the amount of dust carried away by the gases. The first is undoubtedly due to the considerable height above the level of catching, as well as to the use of two vertical gas outlets passing into one inclined downtake. The second is due to the great length of the gas outlet pipes and to the number of bends. The gas outlets are where necessary provided by brickwork, which is only 50 mm. (2 in.) thick, so as to protect the sheets from the action of the gases without at the same time materially increasing the load on the old jacket.

The construction of the lift is such that it can safely handle 1200 poods (about 20 tons); by its means the installation and replacement of parts on the throat may be accomplished in a few hours, as it can lift at one time the entire upper hopper or the large bell together with the cup. In installing the throat, successful use was made of the throat hoist and carriage on the bridge of the lift, by means of pulley blocks. Such an arrangement of the lift facilitates not only the construction of the throat, but also insures an ideal speed of repairs without which the furnace might stay idle for a day or even longer.

Each blast furnace man knows how injuriously the operation of the furnace is affected now by all interruptions which destroy the useful inertia of running and facilitate the differentiation of the mixture of the ores and fluxes; in addition to that, during the period of interruption the furnace produces no pig iron. This is why a serious effort has been made to have all unavoidable interruptions take as little time as possible. The construction of the old type of lift, though attractively simple, provided no facilities for rapid repairs, as was found out practically on the occasion of the last replacement of the bell and cup on furnace No. 1, which took nearly three days.

The inclined bridge consisted formerly of two plate girders placed at an angle of 55 deg. Their lower ends bore against the foundations while their upper ends were riveted to the jacket of the furnace. Three pairs of columns of corresponding height further supported the bridge. The too close spacing between these girders and the jacket and the general construction adopted for tipping the cars prompted the adoption, in the original design, of control drums for the hoisting ropes.

In the new construction, in view of a certain raising of the level of charging, through the intro-

duction of the small bell, the angle of incline of the bridge has to be increased and the bridge itself lengthened, and it proved at the same time possible to do away with the control drums. For the fixing of the upper part of the bridge an oscillating swing support was adopted. Such a construction, for the first time used in Russia, distributes in the most favorable manner the load on the bridge over the entire jacket of the furnace, by directing the reaction of the supports to the base of the columns supporting the jacket. This consideration was of particular importance in view of the weakness of the old jacket. This system of supports satisfies also the requirements due to the bending and growth of the bridge under the action of the load and temperature, and eliminates the vibration of the jacket which often causes the destruction of the brickwork, especially in its upper layers.

In America, lately, bridges of lighter construction are coming into use, but the change of bridge in this case was, of course, out of the question. The blast furnace No. 1 of the Nicopol-Mariopol Company, now in the process of reconstruction, will be also equipped with the McKee throat, just as furnace No. 2.

### Special Steel Mill Electric Locomotive

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., working in conjunction with the Baldwin Locomotive Works, has developed an interesting type of special electric locomotive for the Edgar Thompson Works of the Carnegie Steel Company. This locomotive, which is rated at 42 tons is especially adapted for steel mill work, and probably the most striking feature is the extended front and rear platforms. There are other points of interest about the locomotive, as the motors are not of the ordinary railway type, but are commutating pole steel mill units.

The motors used are of the same type as those employed by the steel company for operating cranes and other mill machinery. For this reason no spe-



A Special Electric Locomotive for a Steel Mill Equipped with Commutating Pole Motors

cial spare parts are required and their construction and maintenance requirements are well known by every electrician in the mill. The motors, too, are not mounted on the axles as is the ordinary practice, but are located under the extended platforms. In this way it is possible by lifting the flooring to get at the motors for inspection and repair. If repairs are needed the locomotive is run under a crane and the damaged armature, field coil, or the entire unit, if necessary, is lifted out, and a new part substituted. In this way, it is pointed out, the locomotive is returned to service with a slight loss of time. The time required to repair a motor in place if an accident happens, as would be the case if the motors were mounted according to railway practice, is thus reduced.

## GEAR GENERATING MACHINE

### An Automatic Single-Pulley Drive Type for Cutting All Kinds

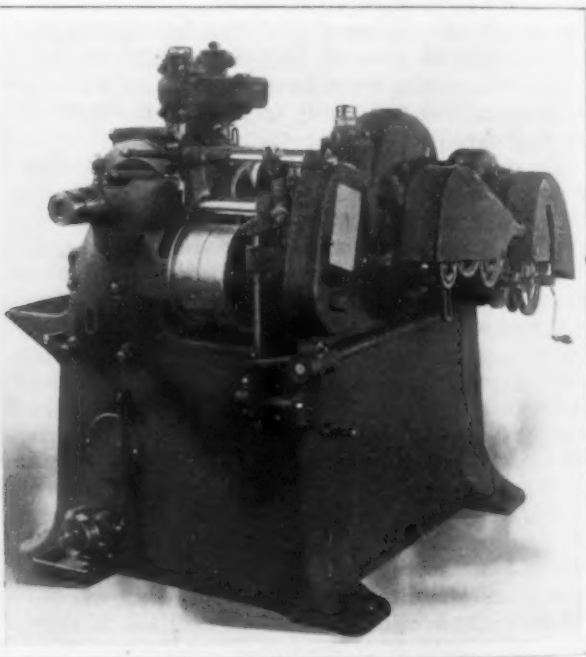
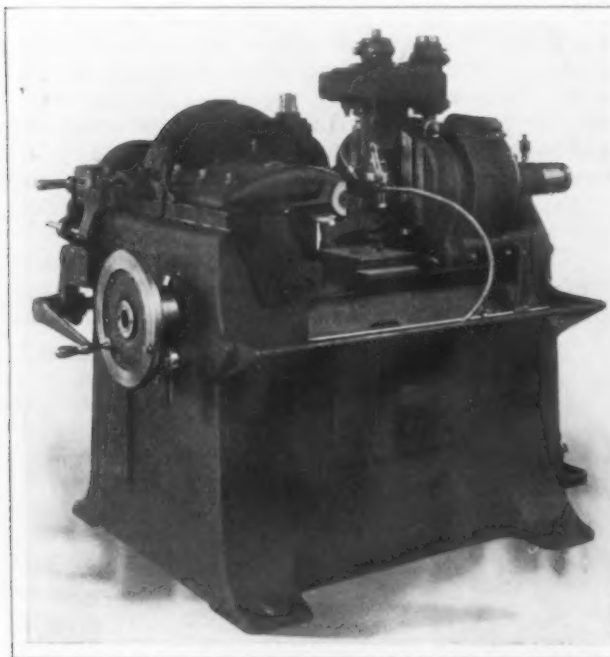
A number of improvements have recently been made in the No. 5 gear generating machine built by the Lees-Bradner Company, Cleveland, Ohio, maker of automatic gear generating and thread milling machines. The original machine was described in *The Iron Age*, July 29, 1909. The changes for the most part relate to the drive. The machine is designed for cutting spur and helical gears and worm wheels and for threading worms. The standard machine will take work up to 14 in. in diameter and a special machine would take work up to 17½ in. in diameter. Worms 8 in. in diameter and 8 in. long and up to 1-in. circular pitch can be threaded on the universal machine.

The cone pulley drive on the original machine has been replaced with a single-pulley drive as shown in the rear view of the machine, this drive being situated below the shaft on which the cone was previously located and between the cutter and spindle mechanism. The main driving shaft is now located in the position formerly occupied by the cone pulley. Gears transmit the power from the lower shaft to the main driving shaft through the gear box giving nine changes of speed to the cutter with a range of from 44 to 147 r.p.m. and a back

mounted. At the right of the main shaft is a pinion which drives the rotating mechanism through a system of change gears as in the former type of machine.

The machine automatically stops when the work is completed, the entire machine being stopped instead of simply the feed. The machine is stopped by shifting the belt to the loose pulley by a shifting device located over the top of the main shaft, that operates with the machine running in either direction. The lever for starting up again is located at the front of the machine just to the left of the micrometer handwheel. This has proved to be a valuable time saver when the time to complete one set of blanks is not very long, as the operator controls the different movements from the front of the machine.

The longitudinal feed of the work slide is controlled by a jaw clutch operated by a hand lever from the front of the machine, replacing a friction clutch previously used. This feed is driven directly from the work spindle to the feed screw by a system of change gears, the distance from center to center to shaft being approximately 8½ in., thus eliminating any error that might result from torsion and long shafts, which are conspicuous by their absence in this machine. The longest exposed torsional member is about 8 in. long in its extreme position. Instead of operating with a push the feed screw pulls the work slide, which has a bearing the full



Front View  
Rear View  
Two Views of an Automatic Machine for Generating Spur, Helical and Worm Gears

gear range of 3 1/3 to 10.8 to 1. The extreme back gear ratio of 10.8 to 1 makes it possible to take advantage of the rigid construction of the machine when using coarse pitches, and the low back gear ratio of 3 1/3 to 1 makes the production very good when using small hobs of light pitches. A plate fastened on the gear shield gives the cutter speeds and the gears to be used. With the cone pulley drive machine there were three changes of speed with a single belt and six changes with a double belt. By utilizing the constant belt speed and additional reduction on the back gear the full capacity of the belt is delivered to the cutter.

From the left end of the driving shaft, looking at the machine from the rear, power is taken directly to the swivel head on which the cutter is

width of the main bed. The construction with a traveling horizontal work slide is original with the hobbing machines built by this company.

In threading worms the change gear arm is thrown around so as to allow the rotating shaft to be geared directly to the feed screw by the change gearing. A new feature is a feed gearing shield slotted in the form of an arc, which is readily swung around to cover the gearing fully when the change gearing is swung around for use from the rotating shaft to the feed screw in the universal machine.

As in the original machine, a micrometer is located on the front of the machine, which is provided with graduations on a disk 6 in. in diameter. This is locked with a thumb screw at zero when starting



View Showing Arrangement of Drive

to take the reading. It is easily adjusted and readily operated for duplicate work.

An entirely new system of lubrication has been provided. There are two lubricating tubes that are held in place by the two slotted clamps shown in the front of the swivel head, the clamps being adjustable and arranged so that one oil tube is used to wash the chips off the cutter while the other is relied upon to keep the cutter and work covered with lubricating compound. By using the two streams of lubricant the chips can be readily removed, being washed out without following the cutter into the work.

An important feature of the machine that adds to its rigidity is the fact that no part of the mechanism is suspended on a screw. All the mechanism is in one horizontal plane and can be readily reached. The new type of machine can be readily equipped with constant-speed motor drive, as a motor can be located at the rear of the machine either above or below the main pulley. The loose pulley is mounted on roller bearings running on a hardened and ground bushing, thus eliminating the trouble often encountered by loose pulleys wearing their bearings out and becoming noisy and inoperative.

#### Production of Lead in 1913

The production of primary refined lead in the United States in 1913, as reported by C. E. Siebenthal, of the United States Geological Survey, was 462,460 net tons, against 480,894 tons in 1912, a decrease of 18,434 tons. The production in 1911 was the heaviest of several years, being 6085 tons greater than in 1912. Despite the lessened production, the primary lead available for consumption in the United States in 1913 was 419,485 tons, against 388,148 tons in 1912, an increase of 31,337 tons. The quantity of secondary lead—obtained by refining skimmings, drosses, old metals, etc.—was 72,834 net tons in 1913, against 67,168 tons in 1912. The quantity of primary lead smelted from domestic ore in 1913 was 436,430 net tons, against 415,396 tons in 1912, while the quantity smelted or refined from foreign ore or foreign base bullion was 50,582 tons, against 88,377 tons in 1912.

The world's production of lead in 1912 is stated as 1,277,002 tons, against 1,224,232 tons in 1911. Of the 1912 production the percentage of the United States is placed at 30.7. The world's figures for 1913 are not yet available and some of those given for domestic production in that year are subject to minor revision.

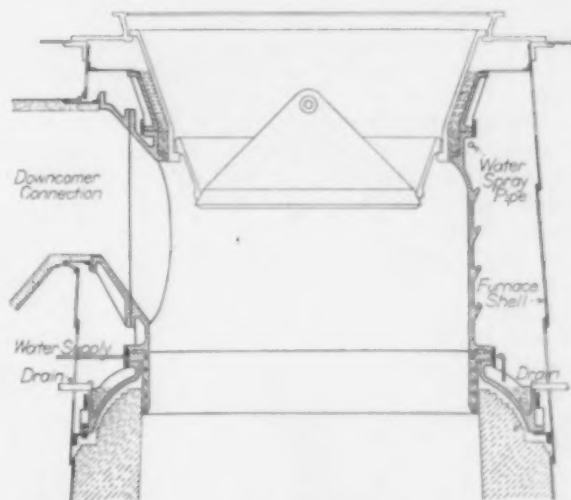
## A FURNACE STOCK LINE SHIELD

### A New and Successful Device to Protect the Inwall of a Blast Furnace

The protection of the inwall of a blast furnace in the vicinity of the stock line has been the subject of much discussion. Many devices have been suggested, but the most recent development in this respect is the construction installed some months ago at the Keystone furnace of the Reading Iron Company, Reading, Pa. It is shown in the illustration and is a device patented by Frank C. Roberts, Philadelphia, and Albert Broden, blast furnace superintendent of the Reading Iron Company.

As indicated, the usual brick inwall is displaced for a distance of 16 ft. below the top of the furnace by a cylindrical metal casing supported from below by the outer metal shell of the furnace. The metal casing is arranged to support only its own weight. The charging hopper, etc., are carried independently by the furnace shell. The upper end of the metal casing is secured to the furnace shell by an annular wrought metal diaphragm, designed to allow for the vertical expansion of the casing and to prevent the escape of gas from the furnace. A circular spray pipe and distributing troughs are located on the outside of the central part of the casing to permit of external water cooling. Protection of the upper end of the brick inwall is afforded by castings containing coils of pipe, through which water is circulated, also by water pockets which accumulate the water of the cooling system before it overflows to the waste. The gas downcomer is connected to the casing by a flanged joint so designed that the casing may expand vertically without disturbing the downcomer. The entire casing is made of steel castings except the upper ring which is cast iron. The casing is heavily ribbed and banded.

A series of openings are provided through the furnace shell around the bottom and the top of the casing; a rapid air circulation takes place through these openings and over the casing. The experience of the Reading Iron Company has demonstrated that air cooling is sufficient under ordinary condi-



A Metal Shield for Protecting the Inwall of a Blast Furnace

tions and that water cooling is only necessary in emergencies. It is essential, however, to circulate water continuously through the coil casting that protects the upper part of the inwall.

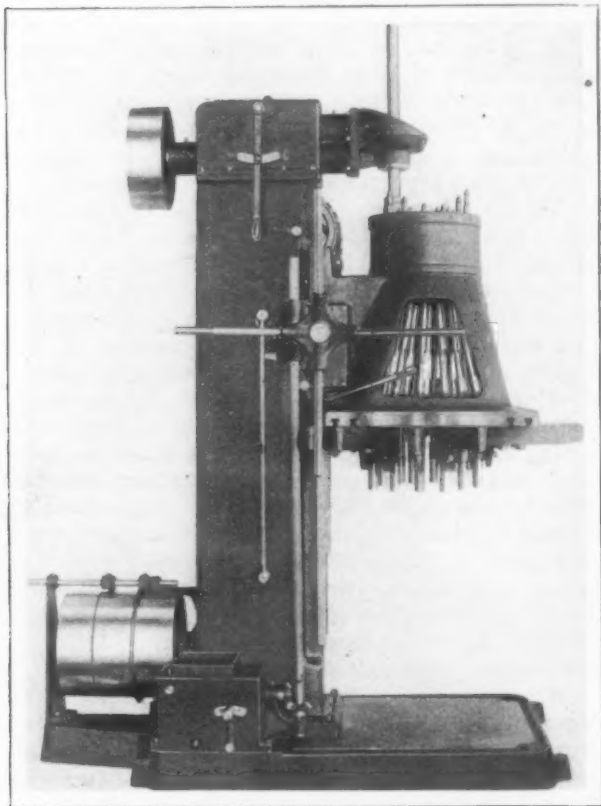
The company's experience with this design of protection has been so satisfactory that it has recently contracted for a similar equipment for its Crumwold furnace at Emaus, Pa.



## A HEAVY DRILLING MACHINE

### A Vertical Multiple - Spindle Tool with a Wide Range of Independent Feeds

A larger and heavier type of multiple-spindle drilling machine has been added to the line built by the National Automatic Tool Company, Richmond, Ind. One of the principal features of the machine is the provision of a wide range of independent drill speeds. It is pointed out that in this way it is possible to secure approximately the correct feed for each size of drill used, as there are



A Larger and Heavier Multiple-Spindle Vertical Drilling Machine

three speed changes provided by the speed box and this number is doubled by the mechanism in the head.

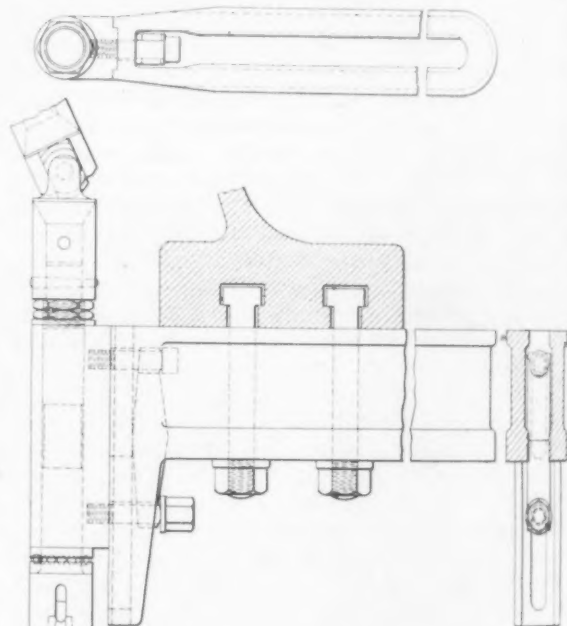
The machine is mounted on a base of massive construction, having an oil channel around the edge for catching the surplus cutting lubricant. A screen pocket in the channel through which the cutting lubricant must flow is relied upon to remove any chips before the liquid passes to an auxiliary tank. A pump, which is entirely independent of those employed for oiling the machine, brings the cutting lubricant back to the drill point. If desired, a T-slot can be furnished in the base.

Several sizes of head are furnished and can be equipped with various combinations of adjustable spindles and cluster boxes for carrying drills ranging from  $\frac{1}{8}$  to 1 in. in diameter, while special heads can be built to order. All of the heads have power feed, a back geared pilot wheel to facilitate rapid advance and return and an automatic feed trip and are counterbalanced. Hardened and ground steel is used for the spindles, which have ball trust bearings and lock nuts at the upper ends to take up all wear. The spindles can be fitted for either straight shank or Morse taper drills and can also be provided with individual flexible oil tubes for flooding the drills with cutting lubricant when drilling in steel or aluminum. Variation in the length

of the drills is compensated for by a vertical adjustment of the bronze bearings carrying the drill spindles. It is pointed out that this adjustment is secured easily and quickly by loosening one nut that is accessible at all times, irrespective of how closely the spindles may be grouped. It is further emphasized that this spindle arrangement holds the bearing rigidly to the end of the arm, which may be moved to cover any layout within the range of the head being used. The spindle center and the center of the arm are in line, a construction which is relied upon to eliminate the tendency of the arm to twist and break the drills.

The universal joints used on these machines are milled from the solid. Only five pieces are used in their construction, and it is emphasized that joints do not depend on drilled cross pins or small screws.

The speed box, which gives three changes of speed, is of the sliding, transmission type. The gears are of coarse pitch with wide faces and are hardened. The speed box and the feed box gears have a cascade system of lubrication with a sight feed glass which shows the operator at once whether the pump is working properly or not. By the use of this speed box it is emphasized that a number



Details of the Spindle Arm Construction

of different sizes of drill can be used at the proper speeds and feeds. If, for example,  $\frac{1}{2}$  and 1 in. drills are being used in cast iron on the same piece of work, it is possible to obtain a feed of 4.72 in. per min. The speed box lever is adjusted to give a rate of 547 r.p.m., or 71.5 ft. per min. for the  $\frac{1}{2}$ -in. drill, with a feed per revolution of 0.0086 in. The driving pinion in the head which drives the 1-in. drills is shifted to a lower position to give a speed of 271 r.p.m. or 71 ft. per min., with a feed of 0.0174 in. per revolution of the spindle. In this way it is possible to get a peripheral velocity that is practically the same, while the feed of the smaller drill is approximately one-half that of the larger.

Vanadium steel frames are now incorporated in 550 locomotives of the Southern Railway, the first ones being put in service in 1907. The Delaware, Lackawanna & Western has approximately 200 locomotives equipped with the same type of frame, the first of which were installed in 1908.

### Machine Tools Legally Defined

What constitutes a machine tool has been again further limited by the ruling of Judge Fischer of Board Two of the United States General Appraisers on April 21. It disposes of a large number of protests and classifies a great variety of machines. Although the case arose under the tariff act of 1909, it is thought that the decision will apply to a large extent under the present law. The protests cover hand-operated and power-driven machines working in various ways to fabricate metal, wood, etc. Under paragraph 199 of the tariff of 1909, assessment was made at 45 per cent. ad valorem, as "articles or wares not specially provided for \* \* \* composed wholly or in part of iron, steel \* \* \* or other metal," whereas the importers claimed a rate of 30 per cent. under paragraph 197 as machine tools.

In February, 1913, the Court of Customs Appeals ruled that "machine tools embraced only such power-driven implements as were used in working upon metal, wood or stone." Subsequently, in another decision, the term was further limited to exclude all wood-working and stone-working machines, either power-driven or otherwise. The present decision goes into the question of the application of power of various kinds, and in summing up, Judge Fischer says: "It will be readily seen that the previous court interpretations of the term 'machine tools' should be further limited and restricted in their application; that, in addition to a machine being operated by other than hand power, and designed to work on metal, it must also perform its operations with the aid of a cutting tool."

Protests were sustained in the case of the following machines: Chain-making machines, metal ring-making machines, machines for cutting and manipulating old tin cans, machines for engraving on metal, machines for cutting metal and metal bottle-cap manufacturing machines. The list follows of machines ruled to be not machine tools: Steel and iron hand punching, shearing and cutting machines, and various separate and additional parts thereof, knitting machines, paper-polishing machines, watch-engraving machines, carbon brush-making machines, lead-pencil machines, tin-can making machines, machine for making metal hose, machine for rolling aluminum, wire-crimping ma-

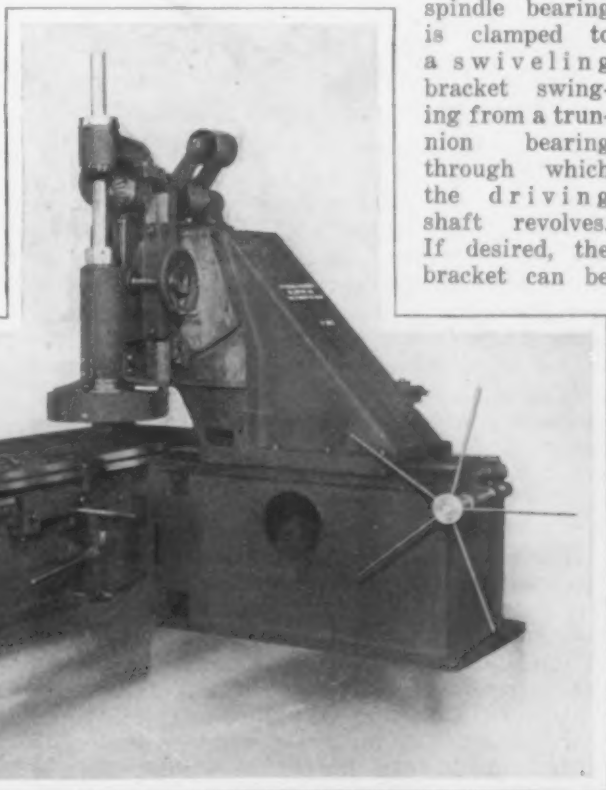
### Special Grinding Machine for Safe Work

For grinding the edges of pieces used in the manufacture of safes and vaults, the Detrick & Harvey Machine Company, Baltimore, Md., has brought out a special machine. The machine is built in a number of different sizes, to enable work of various lengths to be ground, but the width of the table is the same in all, 32 in.

The bed of the machine is of the usual type, with a planed portion on one side, to which a sub-base is fastened at right angles by a tongue and groove joint and bolts. This sub-base acts as a support for the driving and belt shifting mechanisms. In the top of the bed are provided two V bearings for the table, spaced 21 in. on centers. The table is gibbed on one side, with a view to preventing tilting. An overhead countershaft of the hanger type, which is intended to operate at a speed of 300 r.p.m., transmits power through a belt to the machine, the drive being through a pair of bevel gears and a spiral gear engaging a rack attached to the underside of the table. The speed of the table is constant, 24 ft. per min. in either direction, with the normal countershaft speed.

The spindle, which is 3½ in. in diameter, is driven through bronze and steel bevel gears by an 8-in. belt from the countershaft. It revolves in a bronze bushed bearing, which is externally tapered and has a take-up for wear. The end of the spindle is arranged for receiving a grinding wheel 20 in. in diameter with a 4-in. face. The speed of the grinding wheel is 600 r.p.m. A vertical adjustment of approximately 12 in. is provided for the spindle bearing, and is relied upon to give the proper alignment of the wheel when the bearing is swiveled for angular grinding. To enable this

to be done the spindle bearing is clamped to a swiveling bracket swinging from a trunnion bearing through which the driving shaft revolves. If desired, the bracket can be



A Special Edge Grinding Machine That Has Been Developed for Use by Safe and Vault Manufacturers

chine, machine for grinding tools, machine for crushing ground nickel into cubes, bronze powder-making machines, chain making and soldering machine (no proof as to power employed), rolling mills, and pneumatic riveting hammer.

clamped to a T-slotted plate, which is mounted on the upper surface of the sub-base. This upright can be moved toward or away from the table by hand, the power being transmitted through a hand-wheel and screw.

# Producing Steel in Electric Furnaces

Observations Based on Experience Here  
and in Europe—Types of Furnaces and  
Cost Data—The Future of the Industry

An illustrated lecture on "The Electric Furnace for Steel Making" was presented before the Cleveland Engineering Society, Cleveland, Ohio, April 14, by Walter N. Crafts, president of the Crucible Steel Forge Company, Cleveland, and an inventor of an electric furnace of the induction type, which was discussed in *The Iron Age*, September 18, 1913. Mr. Crafts treated his subject under the four following heads:—"Methods of Heating by Electricity," "Types of Furnaces," "Metallurgical Operation of Electric Furnaces" and the "Future of Electric Steel."

At the outset he declared that the art of steel-making has developed to such an extent that excellent steel is being made for all commercial purposes at a cost considered reasonable, and with the crucible, Bessemer and open-hearth processes producing steel of good quality at low costs it will be necessary for the advocates of any new methods or processes to show some real commercial advantages as compared with the older methods of steel making. He did not think the electric furnace is any universal panacea for all the ills that steel is heir to and declared that the development of electric steel making is suffering from too great enthusiasm on the part of its friends, claims having been made for the furnaces and steel that can not be substantiated in commercial operating conditions. However, he felt that there is a great field for the electric furnace, although he does not expect it to replace the Bessemer or open-hearth process, at least for a great many years.

## THE VARIOUS ARC TYPES DISCUSSED

The speaker pointed out the fact that the underlying principle of all electric steel furnaces is merely that of heating and melting by the use of electric current, alternating current being necessary for commercial operation. The heating of steel is accomplished in two different ways according to the type of furnace, so that there is a natural division into arc and resistance furnaces. In describing the different furnaces he confined himself to a few types which have come into most general use in this country and in Europe and which had been most generally adopted in commercial practice. He said that the three best known types of arc furnaces are the Stassano, Girod and Heroult, all in use in Europe and in this country.

*The Stassano furnace* is purely a radiation furnace, which is adaptable to small sizes but has not been successful in the larger units. The current consumption is high on account of the small sizes but this furnace has the great advantage that it can use single or polyphase current of any frequency. The current consumption, using cold scrap and refining to the quality of ordinary steel castings is 800 to 1000 kw. hr. per ton of steel. Several of these furnaces are in use in Europe and possibly three or four have been built in this country, of which one or two have been abandoned and other furnaces substituted.

*The Girod furnace* is a combination arc and resistance furnace. This furnace has electrodes that enter through the top and also water cooled bottom electrodes. The speaker found conflicting state-

ments regarding the wear and life of the bottoms. The life of the bottoms is said to be from 100 to 120 heats when cold stock is being melted, and putting in a bottom requires three days. At the Girod plant in Ugine, France, during 1913 the charge per ton of steel for refractories and linings was \$2 but the management expects this cost to run somewhat lower this year. The electrode cost at Ugine is from \$1.25 to \$1.65 per ton. The current consumption at the Ugine plant varies from 900 to 1200 kw.-hr. per ton according to the quality and kind of steel that is being made, the high current consumption being attributed at least partially to the fact that all of the steel is melted from the cold. The product at Ugine goes largely into steel castings, tool steel and forgings. The Krupp Steel Works, Essen, Germany, has in operation a 10-ton Girod furnace and the speaker said he understood that the Bethlehem Steel Company is building a 10-ton furnace of this type for making high grade alloy steel as well as steel for certain government work.

*The Heroult furnace*, the speaker said, is better known in this country than any of the others, and has reached a high state of development both in Europe and here. In the United States the patents are owned by the Steel Corporation, and in its hands the furnace has probably attained its best efficiency. He referred to various electrode troubles experienced in the operation of Heroult furnaces and investigation of electrodes by the Steel Corporation. The first electrode used in the 15-ton furnace at South Chicago was 24 in. square and 10 ft. long. Within the past year or two amorphous electrodes have been made in this country which are giving better results than was formerly considered possible. Formerly the electrode consumption in a Heroult furnace was 35 to 40 lb. per ton, then it was reduced to 30 lb. and he had recently heard of one furnace that is averaging only 22 lb. per ton. With cold melting there is an average electrode cost of \$1 to \$1.25 per ton of steel. In refining hot metal the electrode consumption will average from 5 to 12 lb. per ton. The current consumption for the Heroult furnace will vary greatly according to the size of the furnace. In an English steel plant which melts from the cold and makes high quality steel the current consumption in a furnace of less than 3-ton capacity was much less than 700 kw.-hr. per ton. A much higher consumption should be expected on a 5-ton Heroult furnace operating for steel castings on the day turn but if continuous operation could be had the current consumption should be brought down nearly to 600 kw.-hr. per ton.

## INDUCTION FURNACES

The induction furnace is really a large transformer for alternating current of either one, two or three phases. The first form of induction furnace was the Kjellin. Mr. Kjellin was the first to develop commercial electric furnaces and several of the old Kjellin furnaces are still in use. The next development was the Frick arrangement of the coils. There are several of these furnaces in operation. The greatest single step in the develop-



ment of induction furnaces was the Roechling-Rodenhauser type.

The speaker referred to the comparative advantages of the two general types of furnaces. The induction furnace has no electrodes and consequently is freed from electrode troubles. On the other hand the shape of the bath is much more complicated than is the case in the arc furnaces, and the slag line is probably at least twice as long as that of the open-hearth or arc furnace of the same capacity. The result is that the scorification at the slag line is much greater than in the case of the arc furnace. After a certain number of heats the induction furnace must be shut down and relined. In European practice this is done every 15 days and takes 2½ days. This delay would be impossible under American conditions of steel plant operation. The current consumption of the induction furnace varies according to the size of the furnace and the quality of metal but in general will run from 650 to 900 kw.-hr. per ton. While the wear on lining is a distinct disadvantage in the induction furnace this type has certain advantages. The current demand is much more uniform and the load on the generating plant is much more desirable than in the case of the arc furnace. The total kilowatt capacity used by the two furnaces is very different and the installation cost for the induction furnace is somewhat more than is the case with the arc furnace. However, the induction furnace has certain advantages which to a person who has had experience with open-hearth practice are very great. The process of melting and refining a heat of steel in the induction furnace is simplicity itself.

In Norway the speaker saw a 4-ton furnace charged with as poor a lot of cold scrap as could be imagined and after the furnace was filled full with half of the charge the current was turned on by simply turning a switch and setting a Rheostat. After doing this the melter went away and did not return to the furnace for an hour. In about 45 minutes the entire mass had settled down into the molten bath and the furnace was ready to receive the remainder of the charge of cold scrap. After the second charge was melted a slag was made to remove the phosphorus. This heat was intended for cheap tool steel and no effort was made to reduce the phosphorus and sulphur to a low point. He said that within the past three years it has become possible to refine in the induction furnace just as well as in the arc furnace.

The speaker said that many considerations will enter into a wise choice of a furnace. For example, an induction furnace must have a little current kept on all the time and therefore is more suited for continuous operation, while an arc furnace will be better adapted to intermittent operation. On the other hand if current is bought from a central station the cost of current per unit will be materially increased by the higher demand.

The metallurgical operation of all kinds of electrical furnaces is the same. The possibility of maintaining on the bath of steel, at will, either an oxidizing or reducing slag is a feature that gives all kinds of electric furnaces their great advantage over the Bessemer or open-hearth processes. In both of the latter processes the heat of the steel is maintained by oxidation, either within the steel itself or in immediate contact with the steel or its slag. In the electric furnace the heat does not come from oxidation at all. In the making of electric steel after the phosphorus and sulphur have been lowered as far as desired pig iron may be added to obtain the desired carbon

content, and any other alloys, if alloy steels are to be made.

It has been claimed ever since electric steel has been made that segregation in the ingot has been eliminated and investigations made in this country and Europe seem to substantiate this claim to a surprising degree. It is an interesting fact that electrically made steel seems to be more dense than either Bessemer or open-hearth steel. This is probably due to its greater freedom from occluded gas pockets, both of blow hole and microscopic size.

#### THE FUTURE OF ELECTRIC FURNACE STEEL

Mr. Crafts said that perhaps the best forecast as to the future manufacture and use of electrically made steel can be made by reviewing the present activities and by mentioning some of the elements that may affect the production of electric steel in the future. Electric furnaces were first used in Europe to make the lower grades of tool steel, but gradually furnace practice has been improved until now excellent tool steel, even high speed, is made in electric furnaces and at costs very much lower than are possible in the old crucible process. The next step was the use of electric steel in small and intricate steel castings. In Europe the electric furnace has largely superseded the crucible and Bessemer processes for steel castings.

For some time in Europe and lately in this country electric steel castings are entering into competition with open-hearth steel castings. In Europe there are several steel foundries making castings exclusively from electric furnaces and they are able to sell in competition with open-hearth foundries. These foundries are selling a considerable tonnage of steel castings in the United States. It is probably not yet possible for American furnaces to lower their prices to meet open-hearth foundries. There has as yet been little development of the electric furnace for the production of tonnage products, although in Europe there are several plants using electric furnaces for making steel for tubes, extra high quality ingots for rolling or forging, steel for armor plates, projectiles, etc.

#### RAILS FROM THE ELECTRIC FURNACE

In Germany some electric steel rails have been made but makers prefer to use their furnaces for making higher priced products. In this country the Steel Corporation has made the most progress in tonnage products, having produced many different steels in the electric furnace for rolling and forging purposes and about 10,000 tons of steel rails, which have not been in service long enough to justify any statement as to their qualities. Electric steel rails roll much better than either Bessemer or open-hearth and experience seems to indicate that they have much greater resistance to shock. This apparent freedom from breakage is especially noticeable in extremely cold weather. Electric steel rails are now selling at between \$40 and \$41 a ton and the speaker believed that their use would be quite limited until the cost is reduced.

He said that a greater use of electric steel will come from two causes. The first will be a demand by the consuming public for a steel of better quality, even though the first cost may be higher. The other cause will be a reduction in the cost of manufacture of electric steel. This reduction in cost is sure to come sooner or later and it will come from

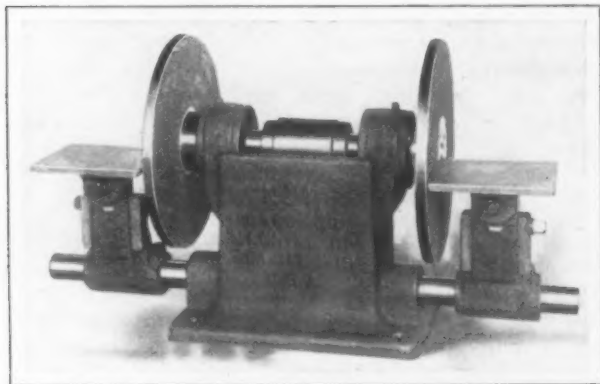
three different sources: 1. The price of electricity may be reduced in the future. 2. An improvement and enlargement of the present furnace designs that will lower the current consumption per ton of steel and will also reduce the cost of repairs and replacement. 3. Development of a furnace in which it will be possible at a low current consumption to convert pig iron directly into steel as is now done in the Bessemer or open-hearth. In its present state of development the electric furnace is a second step for further refining steel after the pig iron has been made into steel and partially refined in the Bessemer or open-hearth. The present electric furnaces can not use pig iron to any advantage. If an electric furnace could be devised that would do away with the intermediate step of Bessemer or open-hearth and would make and refine steel directly from the molten pig a long step would have been taken toward a better quality of steel at a cost equal to or perhaps lower than is now obtained in Bessemer or open-hearth practice. He thought that this step was a long way off but that it would come sooner than many steel men anticipate.

In reply to a question Mr. Crafts said that with a 5-ton Heroult furnace melting from cold and heating to steel casting quality an average of from 4 to 4½ heats could be run off in 24 hr.

### New Bench Type Disk Grinding Machine

The Gardner Machine Company, Beloit, Wis., has brought out a new bench type of disk grinding machine. It is designed for use in toolrooms, assembling departments, model works, garages and any place where the work is small and a considerable amount of close filing and fitting is done.

The machine is equipped with ball bearings throughout, and the wheels used are 12 in. in diameter. The spindle, which is mounted in ball



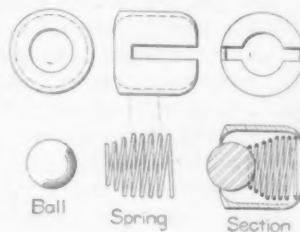
A Recently Developed Bench Disk Grinding Machine Which Can Also Be Furnished with a Pedestal

bearings, is 1 9/16 in. in diameter and is driven by a pulley, which is 3 in. in diameter with a face 3¼ in. wide. Plain work tables are supplied unless otherwise specified and are mounted on a rocker shaft, which is 1½ in. in diameter, with an overall length of 30 in.

In addition to the bench type, a machine in which the head is mounted on a pedestal can also be furnished. This machine occupies a floor space of approximately 3 x 4 ft., and weighs 550 lb. The equipment furnished for either the bench or floor machine includes a bench wheel press, two extra disk wheels, an assortment of abrasive disks, a countershaft, cement for mounting the disks, screw driver, the necessary wrenches and extra wheel screws.

### Cover for Oil Holes in Machine Tools

An automatically closing cover for the holes used to lubricate machine tools has been brought out by J. L. Osgood, 43 Pearl Street, Buffalo, N. Y. The special features claimed for the cover are that there is no interference with the flow of lubricant and the cover automatically closes when the oil can is withdrawn, thus keeping dust and dirt from entering the bearings.



Automatically Closing Cover, Full Size, for Oil Holes in Machine Tools

The cover consists of a metal shell surrounding the ball that closes the opening and the spring which forces the ball back into position when the spout of the oil can is withdrawn. The metal shell is slit at two diametrically op-

posite points to provide for the necessary contraction when the cover is inserted.

The cover is manufactured directly from a piece of bar stock in a turret machine and is completed and dropped off without a second operation, the valve and spring being inserted and the end spun over. In connection with the manufacture of the covers an interesting turret tool was devised. This carries the saw, which cuts the slot in the cover without stopping the work carrying spindle.

### Better Industrial Relations Exhibit

The exhibit of better industrial relations held for the week of April 18 to 25 under the auspices of the Business Men's Group of the Society for Ethical Culture at 2 West Sixty-fourth street, New York City, covered developments made by employers to benefit workmen. Most of the work was shown by photographs mounted upon cardboard in large wall displays.

The value of developing the employee's personality and calling on his originality and initiative by putting him on advisory committees, etc., was emphasized. Another part took up the matter of wages, disputes, strikes, etc., and their solution by protocol, profit-sharing and other means. A department was given over to the improvement of physical conditions in different establishments. Models and illustrations were shown of safety devices, improvements of workingmen's homes, luncheon and rest-room facilities, factory hospitals, etc. Schools of applied science now conducted by many corporations for the benefit of their employees occupied a prominent place in the exhibit. Those shown included the Cadillac Motor Car Company, the American Locomotive Company, the Consolidated Gas Company of New York City, the Brown & Sharpe Mfg. Company and others.

Industrial betterment by co-operation of the employees aided by the manufacturer was exemplified by co-operative benefit societies, savings systems, pensions and old age insurance. Motion pictures and talks by leaders in industry on arbitration and conciliation, industrial betterment and industrial education supplemented the exhibit.

The annual meeting of the branch managers and salesmen of the Warner & Swasey Company, Cleveland, Ohio, was held April 21. Talks were given by W. R. Warner and Ambrose Swasey, the heads of the company. Various subjects were also discussed by branch managers, among them being "The Automobile Industry of the United States," "The Future for Manufacturing in the East," "The Prospects for Railroad Business in the Middle West," "The Future for Hand Machines and Automatics in the Brass Trade" and "Intensive Salesmanship." The salesmen were joined at dinner by the heads of departments. About 100 persons were present.

## REGENERATIVE SHOP FURNACE

### Waste Gases Utilized Within Furnace and Blast Curtain for Working Opening

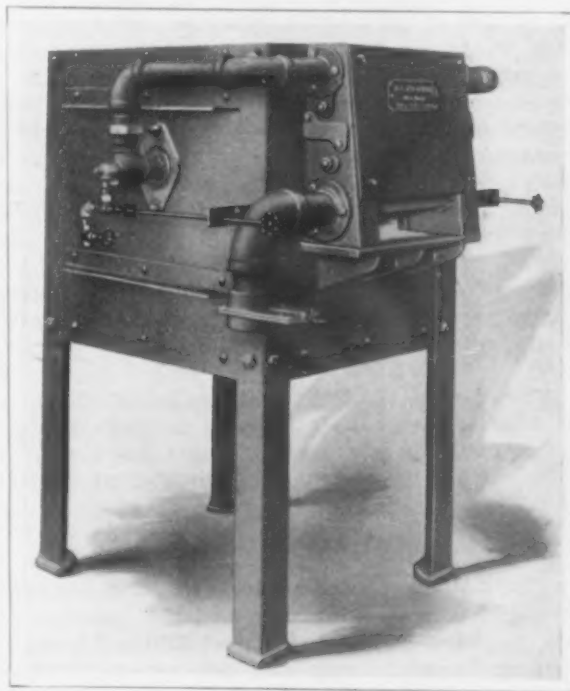
A new type of furnace for use in the forge shop embodying a special economizer shield over the working opening to recover a large percentage of the heat ordinarily wasted and a novel arrangement of blast which acts as a barrier between the operator and the heat has been developed by the W. S. Rockwell Company, 50 Church street, New York City. One of the points is that the operator may work closer to the furnace than otherwise and handle his material faster and with less effort and discomfort. The furnace is designed especially for use in connection with the heating of small and medium-sized work, such as bolt and nut stock, wrench and hammer parts, springs, shears, snips, cutlery and a large variety of general drop forging and light hammer work common in a large range of industrial plants.

In the operation of the furnace the spent gases discharged from the working opening are deflected by the blast away from the operator and against the tubes and headers of the economizer, through which the air for combustion is circulated, with the result that the air, taking up heat in its passage, is delivered hot into the furnace with the fuel. The utilization of the waste heat should, of course, mean economy in fuel and also in the volume of air introduced into the furnace, which in turn not only tends to decrease the power required to deliver the

result of the comfortable working conditions, an output in some instances 60 to 75 per cent. larger than had been previously attained in the same hearth area has been secured.

The furnace is designed for the use of oil, gas or powdered coal and low pressure air, and if desired can be employed in connection with coal or coke. While satisfactory results have been secured with oil and an air blast of but a few ounces, the builder recommends that to secure the best results with the blast and to employ but one blowing system for freeing scale from the dies as well as for serving the furnace pressures of between 8 oz. and 1½ lb. per sq. in. be used.

The furnaces are built with seven widths of heating chamber, ranging from 14 to 48 in. and from 6 in. to 30 ft. deep. Working openings can be provided at one or both ends, as may be desired.

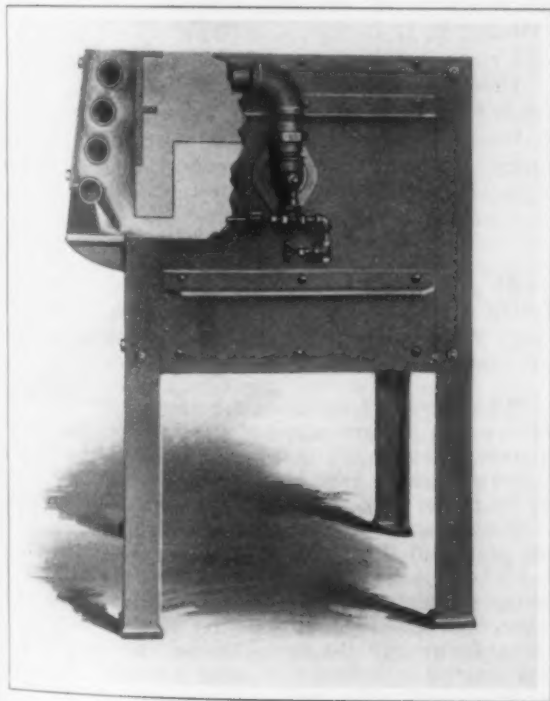


Exterior View of a Regenerative Heating Furnace for Use in Forge Shops

The furnaces may be built on legs or with solid foundation supports, depending upon the size. The leg construction is used only in connection with the smaller sizes, on account of the weight imposed by the heavy linings and the iron work.

### German Steel Castings and the Import Trade

Martin Münzesheimer, managing director of the Gelsenkirchener Gussstahl und Eisenwerke at Gelsenkirchen, Westphalia, sailed from New York this week after a two weeks' stay in the United States, investigating the possibilities of trade in steel castings with this country. He called at the Navy and War departments at Washington. To an interviewer at New York Mr. Münzesheimer said: "I must say that the manufacturers I have seen received me most cordially and freely assisted me in my studies. Personally, I believe, with the lowered tariff in the United States, there will be a large increase in our business with your country. This visit has been most interesting, and I am already looking forward to a longer stay in the United States about the end of this year." Steel castings carried specific duties, under the Payne-Aldrich tariff, ranging up to 7 cents per pound, ordinary castings being at rates representing a minimum of about 35 per cent. The Underwood tariff is 15 per cent.



View Showing the Economizer and the Protective Air Blast

air but the amount of oxidation or formation of scale on the surface of the stock, during the forging operation as well.

In front of the working opening is a blast forming a curtain of air under pressure through which the operator works. It is formed by air discharged from orifices in the bottom or first pipe of the economizer, as shown. In addition to deflecting the waste gases into the economizer, the blast also protects the operator, and it has been found in tests running over a period of several months that, as a



# Work of the American Pig Iron Association

## Northern Furnaces Largely Represented— Heavy Losses Shown on the Operations of Recent Months—Unique Statistical Methods

The first general meeting of the American Pig Iron Association, held at the Waldorf-Astoria, New York, Thursday, April 23, brought out a large representation of pig iron producing capacity north of the Ohio River. Virginia furnaces were also well represented, but otherwise the attendance from the South was limited to officers of two Tennessee companies. It may fairly be said that so many of the pig iron manufacturers of the country have never been together at one time.

The deliberations of the meeting gave no cheering picture of the present condition of the pig iron trade of the country. It was agreed, however, that progress had been made since the organization of the association in January. Its activities have been largely in the direction of gathering data which would indicate the condition of the industry as a whole and show to each member the disastrous results of the low prices and depressed business which have prevailed for many months. In the discussions of the day mention was not omitted of the fact that foreign pig iron now has easier access to the American market, as already demonstrated by the sale of Nova Scotia iron in Eastern districts.

President J. G. Butler, Jr., called attention in his address to the desirability of uniform contract stipulations for pig iron and this question was discussed at some length, though without definite action.

### UNIQUE STATISTICAL METHODS

The statistical work of the association has been developed in a striking way, and the activities in this direction of D. T. Croxton, of the Cleveland Furnace Company, were specially commented on in the report of the association's secretary, John A. Penton, of Cleveland. By means of the forms devised by Mr. Croxton the members of the association in their various district meetings are able to compile accurate statistics of stocks of pig iron on hand at the end of a given month, unfilled orders on hand, etc. It has also been possible to secure with entire secrecy, so far as individual returns are concerned, composite figures of the cost of making iron in a given district for the month, and the profit or loss on shipments made in the month, as well as on iron represented in new orders of the month. An adding machine is brought into requisition at the meetings and individual figures are put upon the machine in an entirely confidential way. Anonymous slips are used—one for each item of the data compiled—and each slip is destroyed as soon as the figures have been put on the machine. Thus totals and averages are made up and announced at the meeting and each member present carries away with him the composite record.

A committee was appointed to recommend a general efficiency system for the plants of the members of the association. This consists of the following: Hugh Kennedy, Rogers-Brown Iron Company, Buffalo, chairman; J. B. Newton, vice-president and general manager Virginia Iron, Coal & Coke Company, Roanoke, Va.; F. W. Blair, Lake Superior Iron & Chemical Company, Detroit, Mich.; T. H. Wickwire, Wickwire Steel Company, Buffalo;

C. E. Buek, Chattanooga Iron & Coal Corporation, Chattanooga, Tenn.

It was decided to hold the general meetings of the association in April and September of each year.

### BANQUET DISCUSSIONS

A dinner attended by members of the association and a few invited guests was held at the Waldorf-Astoria Thursday evening. While trade discussion was presumed to be confined to the day session, the informal speechmaking after the dinner drifted inevitably to the subject uppermost in the minds of the members. Allusion was repeatedly made to the fact that the balances of pig iron producers had for months been written in red ink. While the futility and illegality of any effort to fix prices were steadily in mind, it was believed much could be done to remedy the deplorable conditions under which pig iron producers had gone on, by giving wide publicity to the facts as to the plight of the industry. President Butler called on the following to respond to toasts: W. A. Rogers, Rogers, Brown & Co., Buffalo; H. S. Chamberlain, Roane Iron Company, Chattanooga, Tenn.; Leonard Peckitt, Empire Steel & Iron Company, Catsasauqua, Pa.; M. C. Armour, Iroquois Iron Company, Chicago; F. B. Richards, M. A. Hanna & Co., Cleveland, who is treasurer of the association; David T. Croxton, Cleveland Furnace Company; Hugh Kennedy, Buffalo; John A. Penton, secretary; J. C. Wicks, Garry Iron & Steel Company, Youngstown; R. F. Grant, general counsel of M. A. Hanna & Co., and A. I. Findley.

### President's Address

At the morning session President Joseph G. Butler, Jr., vice-president Brier Hill Steel Company, Youngstown, discussed trade conditions and the work of the association as follows:

It has been my ambition for nearly a quarter of a century that an association of merchant pig iron manufacturers, national in its character, should be formed. Various attempts have been made to bring this about, but up to the present time all such efforts have failed.

The Bessemer Pig Iron Association, with which I was connected for a period of 17 years, was dissolved about two years ago, because of the fact that the furnaces comprising the association had gradually either been absorbed by existing steel plants or the companies owning the furnaces had built steel plants, thus making a market for their product. When the Bessemer association went out of existence, one of the gentlemen connected therewith, largely interested in the iron and steel business, said to me that he hoped I would succeed in forming an association which would take in the entire merchant blast furnace industry of the United States; and I may say that it was largely the result of this talk that has brought about the present association, which was formed in the city of New York on January 8, 1914.

### NINETY PER CENT. OF NORTHERN CAPACITY

I may be pardoned if I say that in the short time since the organization was formed, no similar organization in the country can show an equal record of growth, as far as membership is concerned; and I doubt whether any association has accomplished as

much in bringing together an equally large percentage of those engaged in any one industry in as short a period of time.

From the nature of the business there has existed always a great need for an organization of this character, and none has previously existed. To this last may be traced many of the evil conditions under which the industry has always suffered and is still suffering. We have enrolled to date 69 members, controlling 143 blast furnaces. This number represents more than 90 per cent. of the merchant blast furnace capacity north of the Ohio River.

While much has been gained for all of us by the interchange of individual experiences concerning the problems that confront the manufacturer of pig iron of all grades, I think, all here will agree that it remained for one of our members, D. T. Croxton, a practical blast furnace man, to evolve a method whereby, without any one divulging the details of his own individual business, all have had an opportunity to know the exact conditions under which the industry was operated in each of the six districts into which the country naturally divides itself. Too much cannot be said for the excellence of his system and the extent to which it is bringing us all face to face with the deplorable conditions under which we have been trying to do our business, confronted on the one hand with the great hitherto unsolved problem of taking care of our ore account when there is no market for pig iron, and on the other with the problem of how to conduct our business so that no loss may be sustained and the way pointed out for making a reasonable profit.

I commend, for your consideration, this subject and shall suggest its being discussed during our deliberations and if the thought meets with your approval, will recommend the appointment of a committee to make a report before we adjourn as to the propriety of continuing to bring out at each session of the various districts, for the time being at least, the results that apparently cannot be secured in any other way and which are certainly operating to increase the knowledge we all have of existing conditions and improve our efficiency in overcoming the difficulties which so constantly confront us.

Another matter which—it is proper—should come before us at this time is the consideration of the great question of not only safe-guarding our employees from danger, but doing all in our power to render more satisfactory the conditions under which they work. This is now everywhere being considered desirable not only from a business standpoint, but it is a duty we owe ourselves as well as those who work for us.

#### A TARIFF COMMISSION URGED

No industry in the country more quickly feels the impetus of good business conditions, and none is so quickly influenced by adverse circumstances. And, while it is a subject that I do not desire to discuss at length at this time, I believe that the recently passed tariff was of necessity formulated by men who from the very nature of their occupation were naturally uninformed in many ways concerning the important questions passed upon by them, and I feel justified in urging you to consider the advisability of requesting that our national congress shall, before its adjournment, adopt such provisions as will lead to the appointment of a non-partisan tariff commission that shall at an early date give consideration not only to all of the more important sections of this measure, but especially to the iron and steel schedules with the purpose of not only rectifying any existing inequalities, but that it shall put to rest any unjust criticisms if existing tariffs are found to be fair and equitable.

As long as our tariffs are largely the work of political parties or partisan organizations, they are going to be an issue, and our people can well afford to know the exact facts, no matter what the expense, and insist that when these are gathered scientifically by men free from partisan bias, our national legislature shall listen and act in harmony with the recommendations made.

#### UNIFORM PIG-IRON CONTRACT

In no one respect could we demonstrate this asso-

ciation's power for good more than by the adoption of a uniform form of contract to be used by all of our members and customers alike and which should contain all the necessary provisions to protect seller and buyer irrespective of grade, analysis, time of delivery, terms of payment, etc. There is no reason why one customer should not receive the same treatment as another, when it comes to the terms and conditions of sale. There should be no discrimination, and while the customer may always ask for a concession, he is invariably easily satisfied if he has a feeling that he is being accorded the same treatment as others in the same line of business. These and other subjects will be brought before you for your consideration. I am confident that your deliberations will be productive of great good to an industry whose prosperity is most intimately entwined with that of our country.

I do desire to urge, however, that in all things we be entirely frank with each other in every way and that we remember that this is an age of co-operation, and without desire or intent to do other than observe all the laws of the land, we can easily and strictly within our rights, at all times exchange much information concerning our costs and production, etc., in a way that will be mutually interesting and very helpful.

And we should remember always that in all our efforts we must not overlook every opportunity to increase the value of the service we are rendering our customers, and by doing all in our power to standardize and improve the quality of our material and prevent the consumer from needless loss and embarrassment, we are only going to, in the long run, do ourselves a service and bring to this association a measure of respect and confidence that may be its most valuable asset.

#### Report of the Secretary

The secretary, John A. Penton, reported on the activities of the association in the first three months of its existence, saying that the work of organization had so far progressed that practically the entire merchant pig iron industry north of the Ohio River, with a few scattering exceptions, is now included. The report, practically in full, is as follows:

##### AN ACCURATE DATA SYSTEM

The meetings of the different districts have been uniformly well attended and a maximum of interest has been taken in all our proceedings. This has centered mainly about the method devised by Mr. Croxton for assembling accurate data covering costs and prices on the one hand and stocks, shipments, orders, etc., on the other. This system, only possible of conception by one of wide practical experience, possessing the greatest familiarity with all details of furnace operation and management, has been thus far the main inspiration of the association's activities and has brought home to each member a degree of knowledge of conditions in each particular district that no one anticipated. This has been gradually improved from time to time until we are now able by its use to determine accurately many things concerning the dismal conditions of the industry in each producing district that had not been previously even suspected.

While realizing his own unfortunate condition always, each individual member imagined that in a large measure his situation, for particular reasons, was peculiar to himself. He did not appreciate that during the nervous struggle he was making to keep himself afloat and his plant in operation, some times at a very great loss and with a serious impairment to his capital account, his competitors were all doing practically the same thing. But through this system, which has brought together and consolidated into one exact set of figures the costs, selling prices, production, stocks on hand, etc., of all of our members all over the country, taken right from their books, we have been confronted with the truth that this great industry, in a measure the cornerstone of the iron, steel and general manufacturing business of the nation, has been for some time losing vast sums of its stockholders' money.



## THE RECORD OF LOSSES

Grouping all of the figures gathered by the accountants who had charge of the system in each plant, and taking the last month for which all the data have been compiled, namely February of this year, we find as follows:

1. That the average loss per ton on all pig iron sold by our members, representing for that month above 85 per cent. of the merchant pig iron made north of the Ohio River, was \$1.15 per ton.
2. That the total production of our members during February was 437,603 tons, which means a total loss on sales for February of \$503,243.45.
3. That the average loss to all of the members for that month on iron shipped was exactly 95c. per ton.
4. That the total iron shipped by all of the members during that month was 338,223 tons, which means a total loss on shipments for February of \$321,311.85.
5. That the average loss on unfilled orders upon the books of all the members March 1 was exactly 73c. per ton.
6. That the unfilled orders amounted to 1,714,801 tons, which means a loss upon the unfilled orders on the books of the members March 1 of \$1,251,804.73.

There is an illusion in the minds of some people in America, though they have not had any real experience, either as owners, operators or dealers in pig iron, that any affiliation with this industry was certain to be successful. But the records of furnaces that are shut down, the number of receiverships and the monetary loss all are enduring, have brought home to us all the realization that a continuance of the conditions that have existed and that now exist in the business world and in this industry, can only bring to us a period of sad disaster.

## GOVERNMENT FIGURES ON PIG IRON COST

As showing the severe economies practiced at the furnaces of our members and as an evidence that the data submitted of the cost of our product can be more than substantiated, I submit for your consideration Part 3 of the Report of the Commissioner of Corporations on the Steel Industry, submitted by Secretary Redfield to President Wilson on May 6, 1913. On page 87 and pages 541 and 566 inclusive, this volume shows that the average production cost of Bessemer and basic iron in the entire country in the plants represented in this association was \$14.16 per ton in the years 1902 to 1906 inclusive. This figure did not at any time include selling costs and likewise was exclusive of profit upon investment, operation or interest.

There is not a man in the room or a pig iron manufacturer in America who will not agree that the cost of production in 1913 and 1914 in this country has been at least a dollar a ton more than it was in 1902 to 1906, as the result of increased cost of labor, fuel, liability insurance and other items entering into our costs at this time, which would bring our minimum cost at present to \$15 per ton for Bessemer. If after that we were to add as a very reasonable profit \$1 a ton, the price at which our product should be sold (and a price to which no fair-minded consumer would object) would be at least an average of \$16 per ton at the furnace for Bessemer iron. And yet the average actual price of all iron sold by all of our members reporting during the month of February was \$13.30 a ton, a figure that was 86c. per ton less than the average bare cost of furnace production according to Government experts during the years 1902 to 1906 inclusive, for the grades referred to in that report, when it was being made at a dollar per ton less than it is being made for now.

As the difference in cost between the production of Bessemer on the one hand and foundry and basic iron on the other, is about \$1 a ton and the cost of production since those years has increased as indicated, nearly \$1 a ton likewise, it is not unfair in any way to use the Government's figures of that date for the grades they refer to as applying to our own entire average production cost at this time.

Taking the figures of that period as a basis, we would find that the 375,392 tons of iron sold by our members north of the Ohio River in January, 1914,

was sold for \$321,819.12 under the Government's estimate of cost and exclusive of selling charges, interest charges, etc. Adding to this 86c. per ton loss for the period referred to, the usual selling cost of 35c. per ton, we find the loss on January business alone amounted to \$454,224.32.

These figures can be multiplied and extended indefinitely by using Secretary Redfield's costs and values to demonstrate the tremendous sacrifice of raw material and capital in recent months, and only lack of data prevents the consideration of the figures showing losses upon our operation for a longer period and covering the previous months.

## HANDICAP OF FREE PIG IRON

And now added to the foregoing is a handicap placed upon the entire industry by a Government that has made a special proclamation of its great desire to aid the American people and to make secure for all time the basis of its manufacturing interests and the prosperity of its business men.

We have now confronting us one more hardship in the shape of the knowledge that foreign countries owing to the abolition of our tariff and because of their lower cost of production are going to be able to ship, and are even right now shipping and arranging to ship, quantities of foreign pig iron into our country when the whole industry here is operating at a loss of millions of dollars a month. It would seem to be absolutely inconceivable that all this can be true, but every man engaged in the iron and steel business in the country knows it is true.

Is it any wonder that a large percentage of the blast furnaces operated by our members are closed down and more are closing?

Is it any wonder that some of our members have reduced, are reducing, or are contemplating reducing wages of their employees?

Is it any wonder that this business and every business in America connected with it or depending upon it is halting or has halted?

If our foreign friends can afford to ship into America when we are selling at a figure that is less than the Government's own estimate of costs, who knows or who can tell what they are likely to do if the American manufacturer should ever be in a position to sell pig iron again at a profit over the charges for production?

Time only can solve the problems that confront us—time and the application of every possible economy and comparison of results by manufacturers and a willingness to stand up close, shoulder to shoulder in defense of our industry, our stockholders, our trade and our employees and to endeavor by every possible means to prevent a continuance of the conditions that have placed such a burden upon all engaged in the business.

But out of all this some measure of comfort must come, we must feel confident, and that the situation which has cast its pall over us all can continue indefinitely no one can believe. That we have tried, are trying and are going to continue to try to do our very best to reduce our costs and increase our plant and operating efficiency in every conceivable way, so as to be able to meet conditions, is of course certain, and that we somehow or other are going to succeed must be sure.

An interesting machine for building wire fences has been placed on the market by the Union Sales Association, 300 Rea Building, Terre Haute, Ind. The horizontal or line wires are stretched tightly between the corner posts, which may be set at any distance up to, say, two miles, depending on the ground over which the fence is to be built. After the line wires are tightened the machine weaves the mesh wires at the rate of from 16 to 22 ft. per min. The machine is operated by a self-contained gasoline engine, which also propels it. The fences range from 9 to 52 in. in height, the line wires being placed 4½ in. apart. Either barbed, coiled or plain wire may be used for the line wires, and the machines will make either 3, 5, 7 or 12 in. mesh. The average output of the machines is 40 rods per hr., including the time required to change the spools of wire.



## ALUMINUM IN RAIL STEEL\*

## Its Influence on the Ingot and the Finished Product

BY M. H. WICKHORST

An investigation was made concerning the influence of aluminum on Bessemer ingots and rails, when added to the molds while pouring the steel; and at the same time some tests were made on the influence of silicon on Bessemer rails, when added as ferrosilicon to the molds. Four ingots were split open and a chemical survey was made of these; 11 were rolled into 85 or 90-lb. rails and used for drop tests and transverse tests of the base. This work was done at the South Chicago works of the Illinois Steel Company, which furnished all the material.

Five ingots were of untreated Bessemer steel, eight were treated with aluminum varying from 1 to 10 oz. per ton of steel, and two ingots were treated with additions of ferrosilicon equivalent to 0.1 and 0.2 per cent. of silicon respectively. These latter were rolled into rails.

The ingots used for splitting and chemical survey had about 0.44 per cent. carbon. The plain ingot had a large central cavity or pipe in the upper part and a large number of small elongated holes along the sides in the upper part. This ingot also had a raised top. The other three ingots treated respectively with 1 oz., 2 oz. and 5 oz. of aluminum per ton of steel had somewhat larger pipes, but were free from the small elongated holes along the sides. They had flat or sunken tops. Expressed differently, the aluminum-treated ingots had larger pipes, but contained denser steel around the pipes. One ounce of aluminum per ton had considerable influence in this direction and the effect increased a little with increase of aluminum.

The chemical surveys showed a more even distribution of the material in the aluminum-treated ingots, with less segregation or concentration of carbon, phosphorus and sulphur in the interior and upper part. Both plain and treated ingots showed "soft centers" in the lower part of the ingot; that is, there was negative segregation of carbon, phosphorus and sulphur in the interior and lower part of the ingot. The walls of the treated ingots showed a fairly uniform composition throughout their heights. The plain ingot showed a considerable softening or negative segregation in the upper corners. The carbon, phosphorus and sulphur increased in the wall downward until the average composition of the steel was reached at about one-third of the height from the top, after which the wall remained of about uniform composition.

## TWO GRADES OF HARDNESS

Rails were made of steel of two grades of hardness, one of about 0.45 per cent. carbon rolled into 85-lb. rails and the other of about 0.61 per cent. carbon rolled into 90-lb. rails.\* Some were of plain steel, some treated with aluminum varying from 2 oz. to 10 oz. per ton and two were treated with 0.1 and 0.2 per cent. silicon added as ferrosilicon.

In the drop tests, the use of aluminum was in general attended with a considerable increase in ductility in the upper part of the bar, where the ductility was low in the plain steel, especially with

the higher carbon. The addition of silicon had a similar effect, especially with the 0.2 per cent. addition. With the 0.45 per cent. carbon steel the average ductility of the whole bar was about the same in the aluminum treated as in the plain steel, but with the 0.61 per cent. carbon steel it was considerably greater in the aluminum-treated bars.

The aluminum additions and the larger addition of silicon were attended with interior flaws extending downward a considerable distance (30 to 45 per cent. of the weight of the ingot) from the top, while with plain steel interior laminations as seen in the fractures of the drop-test pieces were absent or close to the top end. The aluminum and silicon additions were made to the molds while pouring the steel, and whether the interior laminations in the rails would occur in the same way if the additions were made to the ladle before pouring the steel into the molds, this investigation does not show.

Incidental to this work some results were obtained concerning the influence of carbon on ductility as measured in the drop test. The elongation for 0.45 per cent. carbon averaged about 27 per cent. and for 0.61 per cent. carbon about 17 per cent. Roughly, the elongation decreased 0.6 per cent. for each 0.01 per cent. increase in carbon, between the above carbon limits.

Transverse tests of the base were made by supporting pieces of rail 2 ft. long, on two supports placed opposite each other near the edges of the flanges under the middle of the length of the piece tested. The supports were 6 in. long and were placed  $\frac{1}{2}$  in. in from the sides of the flanges. The load was applied in the test machine to the head of the rail at the middle. With the 0.61 per cent. carbon steel, treatment with 2 oz. of aluminum was attended with considerable increase in transverse strength and sag of flange before breaking. With treatments with 5 oz. and 10 oz. of aluminum per ton of steel there were some further increases. With the 0.45 per cent. carbon steel there were small increases in transverse strength and sag of flange with the aluminum treatments as against plain steel.

## BENEFITS OF ALUMINUM ADDITIONS

To sum up: Ingots treated with aluminum added to the mold were of more even composition throughout than plain Bessemer steel. There was less positive segregation in the interior and upper part of the ingot, but the negative segregation or soft center in the interior and lower parts of the ingot was about the same. There was a softening or negative segregation in the upper part of the wall of the plain ingot, while in the aluminum-treated ingots the walls were of fairly even composition throughout the height of the ingot. Aluminum-treated ingots had larger and deeper pipes than plain steel, but had denser steel around the pipes.

Rails of plain steel had a brittle zone in the upper part of the bar as disclosed by the drop test. In the rails of aluminum-treated steel this zone was largely eliminated. Rails of plain steel contained their laminations close to the top end of the bar, while in aluminum-treated rails the interior laminations were found a considerable distance from the top end, varying from about 30 to 45 per cent. of the weight of the ingot. In the transverse test of the base, rails of aluminum-treated steel showed considerably greater transverse strength of the base and sag of the flange before breaking than the rails of plain steel, with 0.61 per cent. carbon and a little greater strength and sag of flange with 0.45 per cent. carbon.

\*Summary of a report issued as a bulletin by the American Railway Engineering Association and later submitted as an appendix to the report of the Committee on Rail, presented at the annual meeting of the association at Chicago, March 17-20, 1914. Mr. Wickhorst is engineer of tests of the Committee on Rail.

# The Worcester Conventions Last Week

## Leading Features of the Meetings of the National Metal Trades Association and the National Machine Tool Builders' Association

If the two conventions which were held last week need any justification as regards the place of meeting, the unqualified satisfaction which was everywhere expressed by the participants robs the question of any uncertainty. A record-breaking attendance is one proof of the wisdom of the choice, even taking into account that the present condition of business may have helped toward strong representation of the membership. The meetings themselves were notably fruitful,—in discussion of labor conditions, industrial safety, industrial education, industrial management and standardization of tools and appliances,—but the social side was particularly conspicuous for its successes, as the subjoined account will help to show. This could only be the result of a local committee which had evidently carefully planned in advance to meet any contingency and was consequently ready to care for the unexpectedly large numbers. Especially to be commended were the arrangements made for entertaining the ladies, which included automobile rides, luncheons, visits to places of special interest and a theater party. The importance of Worcester as a center of metal-working industries, a fact of which the map printed in *The Iron Age* of April 16 bore strong evidence, made the intervals between sessions highly profitable, as the plants were thrown open to the visitors. Finally mention should be made of a volume, of no less than 324 pages, generously illustrated, which was distributed as a souvenir of Worcester.—W. W. M.

## The National Metal Trades Association

The annual convention of the National Metal Trades Association at Worcester, Mass., April 20-22 inclusive, broke all records of attendance, even though held in a comparatively small city, and in a period of rather dull business. The registration totaled 283 manufacturing houses, which was in excess of the attendance at New York a year ago.

The sentiment was strong that occasionally a smaller center should be selected. Next year, however, New York will again be chosen, probably, and perhaps after that a Western city. Also, the consensus of opinion was that the National Machine Tool Builders' Association should make it a custom to hold its semi-annual convention in the same week and at the same place of the meeting of the Metal Trades Association. The membership overlaps in a large way, and the attendance at both Worcester conventions was augmented as a consequence. *The Iron Age* last week gave details of the Metal Trades convention up to the Wednesday morning session. Tuesday evening the dinner dance was a pronounced success. A few points of President Layman's address should, however, be here set forth:

### PRESIDENT LAYMAN'S ADDRESS

I may with propriety express the sincere feeling akin to hopelessness of the employer in general, that there has not developed a manifest change in the attitude of legislators in this direction. This association does not and will not impede legislative reforms essential to the actual social welfare of industrial workers. But we deplore that legislators do not distinguish between the proper demands of labor for social justice and its improper demands for labor monopoly. In political life, the fact that labor monopoly is as detrimental to the public welfare as capital monopoly seems hardly to have been considered at all, up to this time. The public may be congratulated that capitalistic control, alleged or real, of its legislators is practically a thing of the past, but it should be warned and informed by every means at command of the equally great menace of its legislators being dominated by labor monopolists. It is the duty of the officers of your association and the far-reaching duty of the principals of the member companies to join temperately and openly in a campaign of education by and through which the public may learn that it is as vital to avoid legislating into labor monopoly as to legislate out of capital monopoly.

Your officers have confidence in the high ideals and

the non-partisan attitude of President Wilson on the labor question. While we believe it to have been a serious mistake on the President's part to have signed the sundry appropriations bill of the special session of Congress with the exemption clause pertaining to labor prosecutions, we do not believe this to have been expressive of the President's personal convictions on this question, and we entertain the confident belief that a closer contact of the President with the working organizations of union labor will disclose to him that the prime purposes of these organizations are monopolistic in character, and thereby bring his non-partisan attitude on labor questions into sharper public definition.

One year ago the I. W. W. movement had attained alarming proportions. To-day we believe the menace of it, in a large sense, has passed. All classes of society recognize it to be a destructive rather than a constructive labor movement. This has been true not only in America, but in other important nations. Indeed, the brightest sign of the times industrially is the apparent gradual awakening of the public to a true comprehension of some of the aggressive forms of labor organizations. Now, as never before, is the great middle class public receptive to true information as to labor controversies. This situation has come about, in my opinion, largely because of the rapid elimination of serious social injustice in industrial life. The continuously advancing cost of living has also exposed the serious cost aspect of artificial labor monopoly in industrial life. In surprisingly unexpected ways, the public has taken unto itself in recent months the settlement of certain large labor disputes. This was true at Calumet, also in the great South African strike, also in the strike of municipal employees at Leeds, England, similarly in the great New Zealand strike of dock workers, to some extent also in the coal strike of Colorado.

### SCIENTIFIC MANAGEMENT

Wednesday morning's session opened with an address, illustrated by lantern slides, on "Results of Applied Scientific Management," by George DeA. Babcock, H. H. Franklin Mfg. Company, Syracuse, N. Y. It is planned to print the paper at length in a subsequent issue.

Prof. Dexter S. Kimball, Sibley College, Cornell University, presented a paper on "Basic Principles of Industrial Organization." After considering the best known features of scientific management, he stated:

If human relations may be considered as the motive



power of all enterprises, the method of remuneration for services may be called the lubricant of the machinery. It should be carefully noted, however, that the method of remuneration has no direct bearing upon the operation of the first principles. There is no necessary connection between a man's pay and his output and one employer can often obtain through personal inspiration the same results that another man obtains through an extraordinary wage rate. For this reason there is no one best wage system. In fact, all wage systems rest upon a few simple principles, a discussion of which is, however, beyond the limits of this paper. There is one feature of management, however, that is closely connected with the remuneration of labor and that is the need of teaching men better methods and better habits. This part of management has received little or no attention and yet time and motion study, if they have done nothing else, have pointed out that one of the greatest possibilities of economic gain in industrial production lies in educational methods.

It should not be overlooked that these human relations which are so complex and difficult to analyze are of greatest importance, not so much because of their direct bearing upon production, as because of our changed point of view regarding industry. A new industrial day has dawned in which profits are not the only factor and industry is being looked upon more and more as a general means of supporting human existence. It would seem incredible that any nation as intelligent as this with its educational standards rising steadily and likely to attain a high hitherto unknown, will not arrive at a solution of the division of the profits of industry that will be fair and just, and it is equally incredible that it will not compel all men, willing or unwilling, to abide thereby. Labor-saving management, as based on the principles discussed in the foregoing, without doubt will be much used ultimately because of its economic value alone. All labor-saving methods that lead to increased power of production ultimately come into use, though the opposition to them may be very great at first. But labor saving management will have to justify every one of its features much more fully than did its prototype labor-saving machinery. It will not be enough that it will increase profits, it must justify its place in our social economy.

#### LABOR LEGISLATION

At the afternoon session Walter Gordon Merritt, American Anti-Boycott Association, New York, made an address on "Labor Legislation," in which he said:

The present degree of solicitude for the working classes is past all precedent in the world's history, and is the best assurance that our republic will endure. It has resulted in the enactment of thousands of labor laws in the last five or 10 years, which have almost reached the dignity of a legal revolution.

In one year over 400 labor laws were passed by the various states. We have traveled a long way toward the doctrine that the workers are the peculiar wards of the state, too weak, economically, to protect their own interests, too improvident to fill their obligations to family. The statute books show that in his holy passion for a good cause, the zealot has too often lost sight of the primary principle of fair play toward the employer, but legislation discloses no instance—as far

as I recall—where any unfair labor law has been passed against labor and in the interest of capital within the past 10 years.

The employer is on the defensive, but the forces of labor, with their organizations and their sympathizers, are embarked on a crusade which, from their point of view, makes capital their natural enemy. They are always ready—and in a measure they are right—to benefit labor at the expense of capital, and the only deterrents to more radical action are constitutional limitations and the fear that labor will be injured indirectly by the injury of capital.

Labor legislation which affects the manufacturers of this country may, with considerable precision, be sharply divided into two classes: First, that which relates to the concerted activities of labor to improve their condition through monopoly and restraint of trade. Such are all laws which aim to enlarge or restrict the militant activities of organized labor.

The second class covers a broader and more varied field, where the government itself seeks, through legislation, to promote the health, safety and independence of the worker by protecting him from oppressive and unconscionable contracts and providing for his exigencies.

The legislative remedy is preferable to that which relies on the power of organized labor, in that it protects everyone regardless of union membership, while labor unions seek only the betterment of their own members even at the sacrifice of fellow workers. Whatever you selfishly deny the workers in one field is likely to prove a boomerang to you in the other. I believe in the broad intervention of the state to protect the comfort, safety and independence of the worker, with an accompanying intervention, equally broad, to prevent organized labor from engaging in the unwarranted activities which have absorbed its attention in the past decade.

After going into itemized details of this legislation Mr. Merritt said:

The proof that our legislators and reformers have lost their sense of balance and of fairness is everywhere available. How can the labor unions complain of restrictions on the right of free speech, when they are responsible in part for laws on the statute books of over 20 states forbidding employers from speaking, writing or printing any communication to any employer for the purpose of influencing him to discharge or refuse to employ any person?

Only five states have statutes against boycotting, while but a few more give adequate security against interference with workers. It is to the application of the common law by the courts that we are obliged to look for protection in such matters and now even that is endangered. As you well know, the labor union lobby is actively demanding of the legislatures of our state and nation the enactment of laws which will legalize conspiracy, outlaw business, exempt labor unions from the restraint of injunctions and the anti-trust statutes, and from all liability for damages or criminal prosecution.

The ramifications of the American Federation of Labor designed to drive open shop products from commerce, if once licensed to carry out these ends, can sweep all industry before it. This federation, with its 1600 organizers, 30,000 local unions, 500,000 odd state federations composed of all the affiliated unions



HERBERT H. RICE

President National Metal Trades Association

Mechanical and Civil Engineers,  
PITTSBURGH, PA.



of the state, and some 550 central labor unions composed of all the affiliated unions of the city, in a measure controls the labor of 2,000,000 men and the consuming power of 10,000,000, and is organized and subdivided to exterminate the open shop and non-union workers.

Already eight states have enacted statutes exempting labor organizations from their respective anti-trust laws.

How strange it sounds that we should be called upon to oppose measures legalizing the boycott of open shops by exempting labor unions from the operation of anti-trust laws and injunction laws, when 25 states and our federal government forbid even the discharge of the union man as such!

Your organization and the other leading employers' associations of this country might well organize a joint legislative committee, with representatives from each, which should have for its sole purpose the investigation and study of labor laws, through the employment of experts, and should, as far as possible, cooperate with the American Association for Labor Legislation and the National Child Labor Committee.

Were it not for constitutional limitations, we would have special legal privileges for one group of citizens to destroy business and property, laws forbidding an employer to discharge a person because he belonged to the union, and at the same time relieving that union from liability for its wrongdoing in inflicting damages upon the involuntary employer of its members. There would be laws compelling an employer to recognize the union, laws requiring all products or printing used by the government to bear the union label, and all men employed upon public works to be union men, public employment bureaus conducted at the expense of the state and forbidden to render assistance to any employer against whom the union directed a strike.

B. B. Tuttle, Cincinnati, who is counsel for various associations of manufacturers of Ohio, made an eloquent address on the general subject of labor legislation, and emphasized strongly the duty of the employer to give publicity to his cause, and brought out vigorously the instance of the amendment of the Ohio constitution, which made possible ultra-radical legislation, because the employer class failed to get out its vote when the question came up at the polls under referendum.

#### REPORT OF THE SAFETY INSPECTOR

William H. Doolittle, safety inspector of the National Metal Trades Association, in his annual report made a timely suggestion of a classification for accident reports which should be adapted to all members.

BURNS (including electric, hot metal and steam).....  
BOILER ACCIDENTS (including gauge glass).....  
CHIPS (from tools and material).....  
CRANES

- (a) All accidents in connection with overhead cranes (including shocks, burns, struck by material and handling material) .....
- (b) All accidents in connection with locomotive cranes....
- (c) All accidents in connection with the use of block and tackle .....
- (d) All accidents in connection with winches.....

ELEVATOR ACCIDENTS .....

EXCAVATING .....

EYE ACCIDENTS (foreign bodies in eye not otherwise classified) .....

FALLING MATERIAL (other than by hand labor or hoisting) .....

FALLS

- (a) From ladders .....
- (b) Into unprotected holes .....
- (c) From scaffolds .....
- (d) Slipping from above .....
- (e) Slipping or tripping on ground level.....

FIGHTING OR PLAYING.....

CRAMPS (overcome with heat, etc.) .....

HAND LABOR

- (a) Caught between material .....
- (b) Injured by hand truck or wheelbarrow.....
- (c) Struck by falling material .....
- (d) Run into. Struck hand or part of body against something .....

- (e) Injured by sledge-hammer, hatchet, or hand tools.....
- (f) Injured by slivers, sharp edges, etc.....
- (g) Strains from lifting or piling.....
- (h) Injured by slipping of wrench .....

#### MACHINERY

- (a) Caught in gearing or other parts of machinery.....
- (b) Caught or struck by belt .....
- (c) Caught on set screw or other projection .....
- (d) Injured by breaking of machinery .....
- (e) Injured by grinding wheels .....
- (f) Injured by cutters and metal saws .....
- (g) Injured by jointers or buzz planers .....
- (h) Injured by circular wood saws .....
- (j) Injured by band saws.....
- (j) Injured by other wood working machinery.....
- (k) Injured by punch presses .....
- (l) Injured by rolls or shears .....

INJURED BY PROTRUDING NAILS.....  
MISCELLANEOUS .....

Mr. Doolittle made the following recommendations:

The appointment of a safety committee and the adoption of a safety system in the plant of each member.

The keeping of a record of all accidents according to a uniform classification.

The reporting of all accidents by the employees.

The use of the Safety Bulletin as a means of educating the workmen.

Enforcement of the use of mechanical safeguards, eye protectors, etc., by discipline if necessary.

Theodore O. Vilter, Vilter Mfg. Company, Milwaukee, Wis., told how in one month 98 suggestions on safety matters had been received from the workmen and that of the 98 cases 94 were corrected while four were of no value.

#### PLANS OF THE DEPARTMENT OF COMMERCE

Albertus H. Baldwin, Chief of Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., gave an instructive talk on the work of the bureau and the plans of the department for its development. He told how Secretary Redfield had asked Congress for \$150,000 per year so that the department could have, say 14 men as its own representatives for the special benefit of American business in such cities as London, Paris, Berlin, Rome, Vienna, St. Petersburg, Rio de Janeiro, Buenos Ayres, Lima, Tokio and Shanghai. A fund of \$100,000 is also wanted for the fiscal year especially to investigate matters in South America of interest to the commercial public of this country.

#### NEW OFFICERS

The report of the nominating committee was made by Justus H. Schwacke, William Sellers & Co., Inc., Philadelphia, and was accepted, the following officers being elected:

President, Herbert H. Rice, Waverley Company, Indianapolis.

First vice-president, L. H. Kittredge, Peerless Motor Car Company, Cleveland.

Second vice-president, George Mesta, Mesta Machine Company, Pittsburgh.

Treasurer, F. C. Caldwell, H. W. Caldwell & Son Company, Chicago.

Councilors for two years: P. O. Geier, Cincinnati Milling Machine Company, Cincinnati; Clarence E. Whitney, Whitney Mfg. Company, Hartford, Conn.; H. D. Wilson, Wilson-Snyder Mfg. Company, Pittsburgh; H. N. Covell, Lidgerwood Mfg. Company, Brooklyn; F. F. Beall, Packard Motor Car Company, Detroit; R. H. Jeffrey, Jeffrey Mfg. Company, Columbus, Ohio. M. H. Barker, American Tool & Machine Company, Boston, was re-elected honorary member.

The other six councilors, whose terms expire next year, are F. K. Copeland, Sullivan Machinery Company, Chicago, Ill.; J. W. Harrington, Harrington & Richardson Arms Company, Worcester, Mass.;

Paul B. Kendig, the Seneca Falls Mfg. Company, Seneca Falls, N. Y.; Justus H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, Pa.; Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; W. H. Van Dervoort, the Root & Van Dervoort Engineering Company, East Moline, Ill.

In the ordinary run of events Vice-President Kittredge would have been made president, Mr. Schwacke stated, but was compelled to decline the promotion for business reasons.

The association passed a resolution protesting against the enactment of further laws affecting manufacturing, mercantile, railroad or banking corporations, and especially against House bill 15,657, commonly known as the Clayton bill. It was emphasized that manufacturers are now earnestly endeavoring to assimilate existing legislation and this should be given a trial so that trade may resume at least partial restoration.

The association appropriated \$1000 to be used in assisting the general work of advancing industrial education.

The officers were duly installed. A resolution warmly thanked the Worcester branch for its hospitality.

#### THE METAL TRADES BANQUET

In accordance with its usual custom, the National Metal Trades Association held a banquet on Thursday evening, and the speaking list was confined to two speakers of national reputation. Retiring president W. A. Layman presided as toastmaster, and incidentally Mr. Layman took the occasion to pay a tribute to Donald Tulloch, secretary of the Worcester branch and author of a remarkable souvenir book distributed at the convention, for the large part he had taken to make the convention successful. The two speakers were Dr. J. Lawrence Laughlin, head of the department of political economy, at the University of Chicago, and Dr. W. H. P. Faunce, president Brown University, Providence, R. I.

Dr. Laughlin emphasized that the increase in wages and the decrease in the number of hours of work in industry are due to natural causes, "unions

or no unions." "In theory," he added, "the union is an artificial monopoly, for unionism does not control over 10 per cent. of the workers and its results are dynamical, because they do not control the supply of labor."

Dr. Faunce told how Henry D. Sharpe, one of the trustees of Brown University, was responsible for his being present at the dinner. Early in his speech he referred indirectly to present business conditions by emphasizing that the pessimist comes to the breakfast table, asking "Is there any milk left in the pitcher?" while the optimist says, "Pass me that cream!" There is a good deal of cream left in the American pitcher, he observed. He enumerated briefly the few important inventions which had developed previous to the nineteenth century, such as the mariner's compass and the printing press, and suggested that more tools had been developed in the last 50 years than in the preceding 5000. Cicero, he continued, had about the same type of lamp as Abraham Lincoln, and now we need merely to press the button. Alexander the Great had substantially the same conveniences as Gladstone. What he questioned is, "Are we improving the quality of men as fast as the quality of mechanism? If manhood falls behind tools, nothing can save us." He advanced a creed in which he expressed three beliefs, namely: The essential inequality of human capacity; the inequalities of capacity and attainment can be bound together through mutual understanding; all legitimate business in the American republic is a form of public business. In expanding on the second belief, he told how we are not at all familiar with the practices and customs of, say, China, taking occasion to mention how a year ago he spent some time at the Han Yang steel works, recently described in these columns, where they are exporting rails to California and pay skilled workmen the equivalent of 40 cents a day. The Chinese, he said, wondered why we took so little pains to understand what they really want. Dr. Faunce said also there is too little understanding between those on opposite sides of the glass partition of the factory.

## The National Machine Tool Builders' Association

The National Machine Tool Builders' Association had a most successful semi-annual convention at the Bancroft Hotel, Worcester, Mass., last week. Instead of Atlantic City or New York, the members, under the suggestion of Manager Charles E. Hildreth, selected Worcester, because the National Metal Trades' Association was to meet earlier in the week. This, it was urged, would make the occasion convenient to the many people who ordinarily attend both conventions. The plan worked out into a decided success. Every one had a good time, members and their families. The city proved to be not only the heart of the commonwealth of Massachusetts, but the soul of hospitality. Every one was glad to experience the friendliness of a lot of good people and a good hotel.

President W. A. Viall, Brown & Sharpe Mfg. Company, Providence, R. I., was in the chair. His report of the half year since the annual convention was in part as follows:

As far as business conditions are concerned many, if not all of us, are working under sub-normal conditions, and we are hoping from week to week that there may be a pronounced change for the better. While a hopeful frame of mind does not pay the bills and allow us to employ our full quota, it does help us to plan for the future and to take those steps that will help not

only our own but the general business industry when good times come in.

While it is to be hoped that none of us will hide our heads in attempting to conceal from ourselves the true state of affairs, it is to be hoped that when new plans are brought for your consideration you will consider them with confidence, that we shall merge out of our present difficulties and build up our businesses with the idea that our country will some day be back where it belongs under normal conditions.

Up to about a year ago we were working under high pressure; in many cases our plants were over-taxed, and what would be truly normal conditions appear to be subnormal, and possibly this quiet spell is going to have the effect of making us appreciate what the real capacities of our plants and working staffs are.

We have proved in our own case, and other associations have proved, that organization accomplishes very much in the education of its members and in standardizing practices that in the final analysis is a benefit, not only to those who are participating as members of the association but to the interests of those with whom they have to deal.

#### Activity Before Congress Committees

About two years ago the members of our association did signal service in their discussions of tariff questions before the committees of Congress. At the present time, while our Congress has before it numbers



of bills relative to the regulation of business, we are oftentimes besought to appear before these committees as an association; but your executive and legislative committees have not felt that the best interests of this association nor of the causes under discussion would be best subserved by such appearances.

You all know how you are besought in your private life to send all manner of communications to your congressional representatives, with the result that when such communications are sent in large numbers they do not always have the effect that is sought for. On the other hand, when you appear only occasionally you are far more apt to have recognition. While we shall pursue a policy of appearing before public committees as seldom as possible on general principles, your committees will not hesitate to engage in any activities when such activities appear to be fully warranted by all the facts in the case.

#### *Machinery Exportation*

Our country has taken some steps through special agents of the department of commerce in our own and other industries to obtain a picture of the conditions that were existing abroad, in order that we might be in a better condition to obtain some of the foreign business and the consular service is continually adding to our information. When we talk export trade we are somewhat inclined to think of goods going to Europe, but not only are we to consider European markets, but also other, the so-called neutral, markets as they are being more and more opened to us; and it would seem as though our government could well help us much in the way that other governments are helping their industries.

A better division of export and import figures covering the machine tools could well be furnished, rather than the figures that are given under metal working machinery, including metal working machine tools.

Concessions in railroad rates for export forms one of the means by which exporters are helped. While this is more easily arranged by government-controlled railroads, yet with the matter properly handled by the interstate commerce commission it is possible that the railroads would welcome an opportunity of helping to increase their tonnage by helping export.

We need to keep our interests alive to the matter of patents. We should use our efforts toward equalizing patent conditions in foreign countries so that we should have as great protection as we grant in our country to the foreigner.

We must keep before us the fact that America must export if we intend to keep business going; and it is a thing that we want to impress more and more upon our friends the legislators, as opportunity presents itself. Lower tariffs without materially decreased cost of living, and consequently lower wages, will not place us in even competition on neutral grounds.

As an association we have an opportunity of helping form public opinion on many subjects, and this opportunity does not rest alone upon us but, as indicated above, it rests with each of us to do our part in keeping before public men and public bodies the fact that in attempting to carry on the export trade as a nation we must have occasional governmental help added to all that we can do as individuals.

The reports of Secretary Charles L. Taylor, Taylor & Fenn Company, Hartford, Conn.; Treasurer Albert E. Newton, Reed-Prentice Company, Worcester, and Manager Charles E. Hildreth show that the year has been a prosperous one for the association.

#### RESOLUTION ON CLAYTON BILL

The convention adopted the following resolution, presented by Murray Shipley:

In view of the fact that the so-called Clayton Bill, H. R. 15657, contemplates restrictions to well established business methods of the machine tool trade and because the machine tool business is conducted along extremely competitive lines and is not such a one as this bill seeks to

control, therefore be it resolved that the National Machine Tool Builders' Association at its semi-annual meeting most earnestly protests against the passing of this bill as one which will do harm far in excess of the evil it seeks to cure, and that in our opinion this cure can be effected by methods not inimical to the interests of innocent business methods.

#### THE PAPERS READ

Charles Fair, General Electric Company, Schenectady, N. Y., presented a paper on "What Features of Electric Motors Can Be Standardized for Machine Tools," and J. C. Spence, superintendent, Norton Grinding Company, Worcester, read a paper entitled: "What Can We Do to Induce Ourselves and Our Men to Earn More Money?" The latter paper is printed following this report. Mr. Spence's contribution brought out discussion at length from Peter Weber, president Sloan & Chace Mfg. Company, Newark, N. J.; A. E. Newton, Reed-Prentice Company, Worcester; Fred A. Geier, Cincinnati Milling Machine Company; C. H. Norton, Norton Grinding Company, Worcester; William Lodge, Lodge & Shipley Machine Tool Company, Cincinnati, and President Viall.

At the afternoon session R. G. Williams, safety engineer of the Norton Company, gave a talk illustrated by lantern slides, on "Safety as Applied to the Use of Grinding Wheels," and afterwards made the report of the committee appointed by the National Machine Tool Builders' Association to consider grinding wheel and grinding machine safeguards and matters relating to this subject, which will have to go over to a later issue. The committee recommended, however, that hearty support be given to the other national societies in their safety work. "We understand that a central safety committee has been formed by some of the other national societies, among whom are the National Association of Manufacturers, the National Metal Trades Association and the National Founders' Association. The plan is to eliminate duplication of effort as much as possible, besides obtaining the views of all parties directly interested. For instance, to the National Founders' Association would be assigned the task of specifying safeguards for foundry machines, and this phase of the safety question would therefore not be touched upon by the other associations. We feel that the Machine Tool Builders' Association should be the one to handle the subject of safeguards for machine tools, and therefore suggest that the Secretary be asked to correspond with the central safety committee regarding this matter."

Ross C. Purdy, research engineer for the Norton Company, Worcester, made the following important report:

#### Standard Markings for Grinding Wheels

The committee consists of W. A. Viall, Brown & Sharp Mfg. Company, chairman; G. R. Raynor, Carborundum Company; L. T. Byers, Abrasive Materials Company; H. A. Richmond, American Emery Wheel Works, and G. N. Jeppson, Norton Company.

The formation of this committee resulted from a conference of grinding wheel manufacturers and grinding machine manufacturers, held by request of W. A. Viall for the National Machine Tool Builders Association in New York City, October 21, 1913. Mr. Viall was made chairman. The full membership of this committee met in New York April 7. The decisions reached by this committee are as follows:

#### *Standardization of Grade Markings*

This item refers entirely to establishment of a uniform or standard system of grade markings, and a



definite fixed meaning for each of the marks such as would be had from standard grading blocks. The idea sprung from the obvious desirability of having uniformity in all systems of measurements, in grades as well as in sizes of grinding wheels. To accomplish this would require the adoption of a series of standard blocks, each of which would represent a certain grade. This standard series would be deposited with some disinterested party, such as the Bureau of Standards at Washington, D. C., and a duplicate of each furnished to each of the wheel manufacturers and other interested parties. If this could be done, a given standard grade mark would stand for a definite grade as shown by the standard block.

On first thought the adoption of such a scheme appeared to be feasible, but a true view of the feasibility of it requires consideration of the following:

(a) Would it be of aid to users of grinding wheels?  
(b) Would it be of practical value to the wheel manufacturers?

(c) Would its value to all concerned be commensurate with the involved initial and maintenance cost?

(a) To be of aid to the users of grinding wheels, this standard grading system would have to permit of ordering a wheel of a given grain, grade and size from different wheel manufacturers with expectation that the wheels of like grade would give like service. The factors that mitigate against such an ideal condition are to be found in the differences in materials used, and in the methods of manufacture of the wheels. No two kinds of abrasive, nor no two makes of the same kind of abrasive grind alike even when made into wheels supposedly of the same grain and grade. The truth of this could be shown from records. Take for example the silicon carbide abrasive which is known on the market as Carborundum, Crystolon, etc. The different makes of this abrasive are more nearly alike than the different makes of artificial aluminous abrasive, yet the wheel manufacturers can not in the majority of cases duplicate each other's grinding results with wheels supposedly made to the same grade and grain.

Analysis of competitors' successful wheel is of no value to a wheel manufacturer unless allowance is made for the difference in the wheels that arise from factors other than grain and grade. These other factors are the bond materials, the amount of bond, the method of manufacture, (i. e. whether puddled or pressed), and the kiln heat treatment by which the bond is vitrified. The latter factors offset very widely the sameness in character of the abrasive used. The same causes for differences in cutting character and efficiency are as effective in wheels made from aluminous abrasives known on the market as Alundum, Aloxit, Adamite, Boro-Carbene, etc., as they are in the silicon carbide wheels. In fact, in the wheels made with the aluminous abrasive there is the added differential factor of a wide variation in character of the abrasive grains. No two of the aluminous abrasives will give the same grinding results even when wheels, which, if compared to standard grading blocks, would appear to be the same in every particular.

These fundamental differences in the manufacture of wheels forbids the adoption of standard grading marks being of value to users of the wheels, for each differential has a positive effect on the cutting quality of the wheel and cannot be detected by any grading method now known except that of an actual grinding trial.

(b) The possibility of standard grading blocks being of value to wheel manufacturers is largely answered in the foregoing. Duplication of competitors' wheels is largely a case of actual trial at the customer's plant. Laboratory grinding tests come much closer to finding a duplicate of the competitor's wheel than would an analysis, but even in this a generous allowance must be made for differences in kinds and in conditions of the machines used as well as differences in the operators. There is no test which a wheel manufacturer can make in his own laboratory that will enable him to invariably duplicate a competitor's wheel for a given grinding operation. There are so many influential

factors involved that dependence cannot be placed on any one test, even a grinding test, under any other than the customer's conditions, for absolute duplication of wheels. This being the fact, grading blocks would be of but little use to the wheel manufacturers.

Given the same abrasive and bond and the same proportion of each, mixed and formed by the same operators under like conditions, two wheels can be made that will grade exactly alike but which will show large differences in grinding. To a good grading operator, who is used to a given product, such as just described, the differences in these two wheels would be readily detected and classified. In such a case standard grading blocks made of materials other than those used in the wheel being tested, would be of little, if any, value.

The resistance that a wheel offers to a grading tool, and the grinding sound and the feel (that elbow message which means so much to the one who is grading but which cannot be expressed in words or imparted to another), in fact every factor that is detectable by a grading tool is so dependent upon the abrasive grain as well as upon the bond that a different grading block would be required for each kind of abrasive used. Adding to this the six or more types of bonds and the different methods of manufacture, each of which show differently under the grading tool, it is very obvious that a given set of grading blocks would almost be of as little value to the wheel manufacturer as to the wheel user.

(c) If the situation was not as complicated as has just been described, would the value of having standard grading blocks be commensurate with the involved initial and maintenance cost?

To be of practical value to the user, the abrasive grains used would have to be of the same range in size and the makers would have to use the same combinations of sizes. If the members of the National Tool Builders' Association could know how often it is necessary to make up new combinations of sizes of grains, and to use an unusual mixture of kinds of abrasive to meet special demands, they would readily recognize that the standards would no sooner be adopted than requirements would necessitate a departure from the adopted standards. If standard blocks representing definite cutting qualities are to be kept up to date each wheel manufacturer would be adding several new blocks to the list each year.

Then, too, to make such standard blocks of practical use to the machine tool builder would require establishment of a testing laboratory thoroughly equipped with an assortment of grinding machines, and supplied with a large assortment of materials to be ground. Each wheel manufacturer would have to continually be sending in a variety of sizes and shapes of wheels to be tested if the standardization of their product was to be kept up to date, and the machine tool builders kept posted on the comparative qualities of the different makes of grinding wheels. To the wheel makers who are cognizant of the large variety in demands on grinding wheel in precision work alone, the cost of keeping standard grading blocks up to date appears to be very costly, in fact, altogether too costly to be considered.

Furthermore, if the desired end could be realized it is honestly believed that the machine tool builders would be confronted with a greater confusion than now. The original idea, therefore, is not only impossible but impractical, much more so than the standardization of steel tools, which is yet not realized.

#### *Standardization of Shapes and Holes of Grinding Wheels*

The standardization of shapes and holes in grinding wheels would be of material benefit to both the wheel manufacturer and the wheel user. Standardization of the holes would mean standard spindles for given size wheels. It happens frequently that a shop will have two makes of machines, each calling for very similar if not the same shape and size of wheel, but different holes. This necessitates the carrying of a larger wheel stock by each, the manufacturer, the dealer and the user.

(Continued on page 1098)

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# THE IRON AGE

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## Employees on Steel Works Conditions

But for the stirring war news that practically excluded thought of other things, no doubt much more would have been printed on one feature of the United States Steel Corporation's annual meeting last week. The attendance of six mill employees bearing proxies from many of their associates who are stockholders in the corporation was featured in newspaper accounts, as well as their testimony to the better conditions under which they had worked in recent years. But little comment has been made on the significance of this innovation in corporation meetings. Cynicism is so much the rule in judging all efforts for industrial peace that any evidence of good feeling between employers and employed falls under suspicion. Labor union leaders have never had a friendly word for any improvement in the relations of owners and men that came without their intervention. In fact, the normal relations between employers and workmen as interpreted by labor leaders are those growing out of strength for offense and defense.

It is truth to say—and it is only recording what has been said repeatedly by officers of competing steel companies—that the Steel Corporation has taken a position of leadership in so-called welfare work that has made mill conditions and community conditions incomparably better than anything known before it was formed. The stockholding mill employees who spoke at the meeting last week said that those who sent them believed that they got a square deal from the Steel Corporation. Knowing the distrust existing in some quarters for such friendly sentiment among employees of a great corporation, one of these men was careful to say that he was present at the request of his fellow employees and no one else.

That these employee spokesmen told the truth about the better works conditions and the better scale of living that have come under the regime of the past ten years is well known to any man acquainted with the industry in that period and in preceding periods. It is fair to say that in these ten years a greater advance has been made in all that represents real betterment of the condition of steel workers in the United States than in all the years preceding.

But such work is like all other contributions to human betterment. It is not spectacular; it does not lend itself to sensational headlines or to magazine exploitation. The attacks of gov-

ernment agents, political partisans, social workers full of sentiment but with no experience, and writers who say the sensational things the average reader wants to hear—all these go to the far corners of the land. Meanwhile hardheaded, practical men—presidents of large steel companies, managers, superintendents, safety engineers, a small army all told—have been steadily at work. The results are pension systems, safety programmes, wage increases, welfare work and personal comfort measures representing the outlay of millions of dollars a year. The scale of expenditure for these things would have appalled a steel works owner of two decades ago. Here is a new fixed charge against steel making that will never come off, but will rather grow larger. There may be those who will appraise the movement at its lowest valuation and call it one of the unintended results of the consolidation regime—a hostage given by big business to an unfriendly public opinion. Such a view misses entirely the two facts that are most vital and momentous in modern steel works betterment, to those in position to measure it. These are, first, the willingness of the heads of the industry to accept previously unrecognized obligations to their employees, and second, the reciprocal friendliness of large numbers of employees that has thus far resisted every effort of militant unionism to put the industry on a war footing.

## Comparisons with 1912

Those who are hopeful of an early improvement in the steel market have begun to make comparisons between the movements of the past few months and the movements which immediately preceded the important market rise of 1912.

It will be recalled that the decline in trade activity which preceded the rise of 1912 had been a comparatively long one. In point of time it was not exceptionally long, but it was distinctly exceptional in that the decline occupied a much longer period than had the preceding advance. In steel market fluctuations it is usually the case that if prices and activity increase rapidly they likewise decrease rapidly, and vice versa. The rise of 1909 had been very rapid, the advance in prices extending over a period of seven or eight months, while the increase in production extended over a period of about nine months. The subsequent decline in prices occupied 22 or 23 months, while the decline in production occupied 17 months.

The subsequent low points were July, 1911, for production, and the last week in November, 1911, for prices. From July to November the rate of pig iron production increased 26.8 per cent., while prices continued to decline, the divergence reflecting a principle well recognized in the steel trade, that prices often fall when demand appears, because then there are orders worth gunning for. The buying movement at that time was centered in November, though it extended into December. The recent buying movement centered in January, 1914, though it began late in December and extended into the early part of February.

In both cases the buying movement was out of season, and in each case there was reason to expect a pause until the market got its second wind. In each case important impelling factors were low prices and the exhaustion of stocks, but there was one important difference. In 1911 the market had very important support from railroad buying, while in the recent movement such support was largely lacking. Orders for no less than 42,000 freight cars were reported in November, 1911, while the orders for October, November and December totalled about 68,000 cars. Last January, on the other hand, car orders totalled only about 10,000 cars, and December, January and February combined showed only about 27,000 cars, making a buying movement only 40 per cent., as great as had occurred some two years earlier.

After the buying movement which centered in November, 1911, there was a recession in activity. The Steel Corporation's unfilled orders showed a fairly large increase in January, and a slight increase in February, but March brought a loss. Concurrently steel prices weakened. There were paper advances in December, which held nominally in January, but thereafter a low point developed early in March, substantially as low a level as had been reached in November. At the later low point the heavier products suffered less than the lighter, and manufactured goods, such as shafting, spikes and rivets, suffered the most, reaching prices which were distinctly lower than those of the preceding November. In the second half of March prices began to advance again, and the advance continued almost throughout the year.

A debatable question is the extent to which the season of the year affects these market movements. Assuming the season of the year to be important, the comparison is favorable for the market today, since the preliminary rise occurred two months later, in January instead of November, and therefore two months nearer the time when spring should take the reins. If that is a reasonable assumption, however, there is room for serious doubt whether there is going to be any parallelism at all, since the improvement ought to be observable by this time. Assuming that the season has nothing to do with the case, prices would not need to show a hardening tendency until the middle of May to maintain the interval between the preliminary and the real movement.

As to the rate of production there is a divergence between present conditions and those of two years ago, for, while prices receded early in 1912, production did not decrease. Our blast furnace statistics showed a continuous increase month by month through the first six months of 1912. In-

deed, making allowance for the fact that midwinter and midsummer weather conditions usually curtail pig iron production, it may be said that pig iron production increased with practical continuity from July, 1911, to February, 1913. Production at present shows a divergence from the course of 1912, therefore, since it has lately been decreasing.

In a comparison between 1912 and 1914 there is room for debate as to what one should expect from the fact that 1912 had the support of fairly heavy railroad buying, while today such support is small, and as temperaments vary opinion is likely also to vary. If all things tend to come back to normal, then it is favorable to the present market that it scored the improvement it did last January, without railroad support, for later the railroad support may be expected to be added. Every week that passes brings this nearer.

As time passes actual events stay in the memory, while mental conditions are forgotten. Hence many may feel today that we now have a burden that was absent in 1912, a pessimistic mental attitude. The comparison is hardly correct. The mental attitude in 1912 was far from favorable. An election was impending and the majority of thinking men expected a change in the national administration. In addition, there were a great many who were confident that, according to cycle, a financial panic would occur in 1913. Men had their fears then, as they have them now. On the whole, the comparison with 1912 is encouraging rather than discouraging; the comparison seems favorable, but it is not conclusive.

### Management at Worcester Meetings

In spite of the indifferent reception commonly given of late to mention of scientific management, last week's Worcester conventions, reported elsewhere in this issue, will be regarded as marking a decided step forward in the movement. The emphasis comes from the convincing concrete examples there given of successful experiences with phases of management which, though not necessarily called scientific, are, nevertheless, of this character. One of the papers presenting these evidences, which is printed in the account of the convention, lays special stress on a thing of fundamental importance, namely, putting the employee in business for himself. What adds weight to his statements is the fact that the author himself was numbered among the workmen a few years ago. The paper is an excellent illustration of the change of mental attitude on the part of both employer and employee that is essential to the institution of scientific management. The management takes every measure possible to favor a high level of production, by equipment and facilities, and the employee not only accepts the new conditions but demands them. It stands also as a strong refutation of the common notion that some special form of wage payment is essential. What is regarded as an easily attained day's work is established, and the worker is assured his usual amount of daily wages, except when he exceeds the established standard, when some arrangement is made by which he takes in addition a part of the profits arising out of exceeding the standard.



One vital point about scientific management which may well be mentioned in this connection is that it solves the union question. The individuality it fosters makes a man self-reliant, and the permanency of this condition is assured by the system, owing to the change in mental attitude of which mention has already been made. In other words, injustices on the part of the employer are unlikely, and the employee has everything to lose by not taking care of his own interest. There is no denying that in spite of the large hold the new methods of management are getting in industry, they are still comparatively uninfluential and much unrest exists among employees. The employers' troubles are augmented by the flood of social legislation predicated on the doctrine that workers are the wards of the state. No good remedies were vouchsafed at the Worcester meeting for combatting either the pugnacity of union leaders or the unbridled enthusiasm of the social uplifter, and it would seem unquestioned that the manufacturer's sole recourse is to scientific management.

For this reason employers will do well to study carefully the three unusually good papers of last week. An interesting fact is that they do not cover the same ground. One by Professor Kimball, which may be printed later in these columns, to give more of it than is possible this week, was a lucid explanation of fundamental principles that are not always well understood. Mr. Spence's paper, reproduced at length, is particularly valuable from the hint it gives of how changes in management may be brought about. The third paper, by Mr. Babcock, is a most noteworthy addition to the literature on the subject and will be put before our readers as early as possible.

### Secretary Redfield as a Statistician

It seems almost incredible that Secretary Redfield of the Department of Commerce could be capable of committing such an egregious error as that which appears in the report of his address before the Chamber of Commerce of Columbus, Ohio, April 21. After denouncing the "half truths, exaggerations and misshapen statements" which he declared stalk over the land, affecting the progress of economic changes to new conditions, he proceeded as follows:

We hear, for example, of the importations of iron and steel on both our coasts, and men who like, perchance, to save the mental labor involved in the test of competition evince their absence of industrial courage by being rather pessimistic in the press concerning these importations. They will tell you that 47,000,000 pounds of iron and steel of various kinds have been imported into the United States in the eight months ending with February. This sounds portentous, but the unsaid part of it is that this is about 23,000 net tons, or at the rate for the entire period of less than half a day's work for the United States Steel Corporation. It must of course be a threatening matter to have so very large a proportion of our iron and steel output as this imported. Does one recall correctly that our manufacture of pig iron alone aggregates about 29,000,000 tons a year? This must be seriously threatened by the importation in two-thirds of a year of 23,000 tons of all sorts. I tremble, gentlemen, for the delicacy of a business that is so easily upset as this. I had rather imagined that our iron and steel industry was established on more stable foundations.

Turning to the official documents for a verifica-

tion of Mr. Redfield's figures, we find that according to the February report of the Bureau of Foreign and Domestic Commerce, which is part of his own department, the imports of only such iron and steel commodities as are reported by weight amounted to 183,519 gross tons in the eight months referred to. If all iron and steel imports could be included, the quantity would be considerably greater. Yet Mr. Redfield says the total quantity was "about 23,000 net tons." Such an error as this will be hard for him to explain. It looks as if he should have some competent person edit his speeches and verify his figures before giving them to the public. If such a person had edited this speech he would probably have erased the insulting reference to American manufacturers in the first sentence quoted, as "men who like, perchance, to save the mental labor involved in the test of competition."

### STEEL CORPORATION'S EARNINGS

Deficit for March Quarter, \$6,289,644, Against a Surplus for Corresponding Quarter Last Year of \$7,369,600

The statement of the United States Steel Corporation's earnings for the quarter ended March 31, 1914, shows net earnings of \$17,994,381, against net earnings for the corresponding quarter of last year of \$34,426,801. Thus the earnings this year are barely more than half those of the same quarter a year ago. The usual dividends of 1 3/4 per cent. on the preferred stock and 1 1/4 per cent. on the common stock have been declared. The dividend on the common stock amounts to \$6,353,781, so that almost the whole of it will be paid from the corporation's surplus. The statement is as follows:

	1914	1913
January .....	\$4,941,337	\$11,342,333
February .....	5,655,611	10,820,951
March .....	7,397,433	12,254,217
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants, and interest on bonds of the subsidiary companies .....	\$17,994,381	\$34,426,801
Less charges and appropriations for the following purposes:		
Sinking funds on bonds of subsidiary companies and depreciation and replacement funds .....	4,285,527	7,086,339
Sinking funds on U. S. Steel Corporation bonds .....	1,512,496	1,643,753
Net income .....	\$12,196,358	\$25,696,509
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding .....	5,600,279	5,668,209
Premium payable on bonds redeemable under sinking funds .....	227,023	
Balance .....	\$6,369,056	\$20,028,300
Dividends for the quarter:		
Preferred, 1 3/4 per cent. ....	6,304,919	6,304,919
Common, 1 1/4 per cent. ....	6,353,781	6,353,781
Deficit for the quarter .....	\$6,289,644	
Surplus for the quarter .....		\$7,369,600

The earnings for the December quarter were \$23,036,349 and for the September quarter \$38,450,400. The December quarter showed a deficit of \$1,002,304, while the September quarter showed a surplus of \$11,348,778.

The Kelly Reamer Company, Cleveland, Ohio, at its annual meeting April 18, re-elected officers and directors as follows: W. E. Kelly, president and general manager; W. A. Calhoon, vice-president; H. J. Maxwell, secretary; O. H. P. Davis, treasurer; E. B. Jessup, T. A. Torrance and George Bauer. Officers' reports showed a large increase in the company's business, both domestic and foreign.

## A Proposed National Labor Exchange

WASHINGTON, D. C., April 29, 1914.—The United States Commission on Industrial Relations has outlined a plan intended to "wipe out chronically chaotic conditions in the country's labor market and thus strike a blow at the annually recurring evils of unemployment." The plan is tentative and is made public at this time for the purpose of inviting criticism and suggestions. A synopsis of the proposal is being forwarded to prospective witnesses before the commission who will be examined with regard to its practicability.

The commission proposes to establish a national bureau of labor exchange in connection with the Department of Labor, with a central office in Washington and branch offices in other cities, and with a clearing house for each of several districts into which the country would be divided. The bureau would have power to establish and conduct free public employment offices. The national bureau would have jurisdiction over all private employment offices doing an interstate business or accepting workmen for shipment to other States. State, municipal and private employment offices would be urged to co-operate with the national bureau and to adopt uniform methods and regulations.

The most important service of the bureau would be to gather and distribute accurate information regarding the labor market in various localities. This information would be published in the form of bulletins, to be issued at frequent intervals. One interesting feature of the plan is the proposed appointment of an advisory council for the national bureau and for each of the district clearing houses. It would be composed of an equal number of representatives of employers and of employees, and would assist the director in all matters pertaining to the management, would aid in determining policies, and would see that the bureau was impartial in disputes between labor and capital, thus gaining for it the confidence of the whole public. The district advisory councils would be appointed by the Secretary of Labor.

The scope of the functions of the proposed bureau is very broad. Daily reports of business of each employment office conducted by the bureau would be required to be sent to the clearing houses of the district in which it was situated. Every private employment agent would be required to make a weekly report to the district office, but every State and municipal employment office would be requested or induced to make daily reports. The clearing houses should be distinguished from the employment offices which the bureau would establish wherever such offices were necessary. Each district clearing house would compile and publish the information relating to its district. The central office in Washington would compile the information from the clearing houses and publish it in a labor market bulletin, covering the whole country, in the English language and other languages. The bulletin would contain, besides labor market conditions, other information regarding the cost of living as compared with wages, tendencies of trade to expand or to decay, abnormalities in the supply of labor or demand for labor, etc.

This subject will be taken up by the commission at the public hearings to begin in New York on May 4, when a number of witnesses will be examined. It will also be pursued at hearings to be held at later dates in many large industrial centers. This feature of the commission's work is being directed by W. M. Leiserson, State superintendent of employment offices in Wisconsin and author of the bills to establish similar offices, recently enacted by the New York Legislature. If the project is received with general favor the commission will frame a bill for presentation to Congress, but in the meantime all persons interested are invited to forward suggestions or criticisms.

W. L. C.

In Toronto correspondence to *The Iron Age* of April 16 mention was made of the Eastern Steel Company, Ltd., which had acquired the Brown Machine Company, Ltd., and the Bailey-Underwood Company, Ltd. The Eastern Steel Company was spoken of as of Halifax. This was an error. The main office and works are at New Glasgow, Nova Scotia.

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## Eastern Iron Makers Against Coke Rate Increase

The Alan Wood Iron & Steel Company, Empire Steel & Iron Company, Thomas Iron Company, E. & G. Brooke Iron Company and Worth Brothers Company have filed with the Interstate Commerce Commission a brief protesting against increases in freight rates on coke from the Connellsville, Latrobe and Mountain districts of Pennsylvania and the Fairmont region of West Virginia to the Lehigh and Schuylkill valleys of eastern Pennsylvania. This brief follows the formal complaint entered during the hearings in the rate advance case. It is contended that the rates are already in and of themselves unjust and that the existing rates on coke when compared with the rates on coke to the Pittsburgh district are so high as to constitute an unjust discrimination against the Eastern furnaces and in favor of Pittsburgh. It is also claimed that any increase of rates on coke based on a flat per cent. system will inevitably widen the existing differential in favor of Pittsburgh to the disadvantage of Eastern furnaces. It is stated that a large number of the increases are on intrastate shipments by the Pennsylvania Railroad and a large number are intrastate shipments by the Pittsburgh & Lake Erie Railroad and other lines.

# The Iron and Metal Markets

## PROFITS DISAPPEAR

### Working Forces Further Reduced

#### Curtailment at Pipe Works — Bar Imports Not Formidable

Two sobering exhibits of the week have given a definite measure of the present state of the entire iron industry. One was the statement of the losses of merchant blast furnaces in February, as compiled by the American Pig Iron Association, and the other the quarterly statement of the Steel Corporation showing a deficit of more than \$6,000,000, or practically the common stock dividend.

That many blast furnaces have been selling below cost for some time was known, but the meeting in New York last week developed the fact that the losses were greater and more general than had been suspected. There is evidence that in some Northern districts the startling data the new pig iron organization has brought together have checked selling at a loss. At the same time it is recognized that more furnaces must stop or consumption must increase before the market can be cured of its persistent weakness. Alabama furnaces have thus far held aloof from the association movement.

Steel Corporation profits of \$6 to \$7 a ton on the shipments of the first quarter mean a dismal showing for steel companies which normally make several dollars a ton less than the Corporation. April has been a poorer month than the average of the first three. May and June, if there is an early rate advance, can do better, but otherwise the betterment is not in sight to-day. Wage reductions are still being made at blast furnaces and they may come at steel works any day.

Not only are steel works shipments cutting in rapidly upon contract tonnage, but the rate at which material is called for has fallen off. Mill forces are reduced and pig iron is accumulating at steel company blast furnaces. More stacks will be blown out, including three of the National Tube Company—one each at McKeesport, Pa., Benwood, W. Va., and Lorain, Ohio.

Manufacturers and consumers have rarely if ever been more at sea as to the outlook, and there is more of the feeling that even such a movement as that of January might require all the stimulus a favorable rate decision could produce.

Complaint grows of the meagre demand for plates, shapes and bars, and so little large business comes up that the concessions from 1.15c., Pittsburgh, are still exceptional. Bar iron is weaker and mills in the Chicago district have gone to 1.10c.

More has been said of bar importations at Eastern and Gulf ports than the tonnage warrants. Twisted bars have evidently been the cheapest offering of Belgian and German mills. On these as low as 1.08c. plus 8 per cent. duty, or about 1.16½c. at Gulf port, has been done. Bent and rusted bars have been among the troubles of bar importers, and domestic producers have steadily realized \$2.50 to \$3 more a ton than the delivered prices of foreign mills with duty added.

Structural work has lately been disappointing and April has not come up to the March record, leaving out the elevated work in New York. The

Lake street bridge at Chicago, 2300 tons, has been let and 2100 tons for the Alexandria bridge on the Washington & Southern. At Chicago the municipal pier, 6600 tons, is the chief prospect.

In wrought pipe the demand has held up better than in some other lines, but some slackening is appearing and the Riverside plant at Benwood, W. Va., will be shut down indefinitely. The Logan National Gas Company has bought 7 miles each of 12-in. and 16-in. pipe at Pittsburgh and the Ohio Fuel Supply Company is in the market for 25 miles of 16-in. pipe. Line pipe has been reduced \$1 a ton.

The sheet trade has developed fresh weakness and sales are more commonly at 1.85c. for No. 28 black, while owing to the decline in spelter galvanized sheets carry a differential of 0.95c. rather than 1c.

In pig iron an inquiry for 10,000 tons of basic has appeared at St. Louis and at Pittsburgh some business in basic is also pending. The indications that the melt of foundry iron is decreasing are the disquieting feature of the situation. Some interest has been stirred up in the East in the pig iron required for the cast iron segments for two subway tunnels under the East River. Bids on the tunnels will be opened May 22. Each will require more than 45,000 tons of segments.

## A Comparison of Prices

### Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous		Apr. 29, Apr. 22, Mar. 25, Apr. 30,			
		1914.	1914.	1914.	1913.
<b>Pig Iron, Per Gross Ton:</b>					
No. 2 X, Philadelphia...	\$15.00	\$15.00	\$15.00	\$15.00	\$11.00
No. 2, Valley furnace...	13.00	13.25	13.25	13.00	15.00
No. 2 Southern, Cin'ti...	13.75	13.75	14.00	15.25	
No. 2, Birmingham, Ala.	10.50	10.50	10.75	12.00	
No. 2, furnace, Chicago*	14.25	14.25	14.25	16.75	
Basic, del'd, eastern Pa.	14.25	14.25	14.25	16.50	
Basic, Valley furnace...	13.00	13.00	13.00	15.75	
Bessemer, Pittsburgh...	14.90	14.90	14.90	17.90	
Malleable Bess., Ch'go*	14.25	14.25	14.25	16.75	
Gray forge, Pittsburgh...	13.65	13.65	13.65	15.40	
L. S. charcoal, Chicago...	15.75	15.75	15.25	18.00	
<b>Billets, etc., Per Gross Ton:</b>					
Bess. Billets, Pittsburgh...	20.00	21.00	21.00	28.50	
O.-h. billets, Pittsburgh...	20.00	21.00	21.00	29.00	
O.-h. sheet bars, P'gh...	21.00	22.00	22.00	29.50	
Forging billets, base, P'gh.	25.00	25.00	25.00	36.00	
O.-h. billets, Phila. ....	22.40	23.40	23.40	29.00	
Wire rods, Pittsburgh...	26.00	26.00	26.50	30.00	
<b>Old Material, Per Gross Ton:</b>					
Iron rails, Chicago.....	12.75	12.75	12.75	16.00	
Iron rails, Philadelphia...	15.50	15.50	16.50	18.00	
Carwheels, Chicago.....	11.50	11.50	11.75	16.75	
Carwheels, Philadelphia...	12.00	12.00	12.25	14.25	
Heavy steel scrap, P'gh...	11.50	11.50	12.00	14.00	
Heavy steel scrap, Phila.	10.75	11.00	11.00	12.50	
Heavy steel scrap, Ch'go	10.25	10.00	9.75	12.00	
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	14.00	
No. 1 cast, Philadelphia...	13.00	13.00	13.00	13.75	
No. 1 cast, Ch'go (net ton)	10.25	10.25	10.25	12.00	
<b>Finished Iron and Steel.</b>					
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.	
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25	
Iron bars, Philadelphia...	1.20	1.20	1.22½	1.57½	
Iron bars, Pittsburgh...	1.30	1.30	1.35	1.70	
Iron bars, Chicago.....	1.10	1.12½	1.15	1.57½	
Steel bars, Pittsburgh...	1.15	1.15	1.20	1.80	
Steel bars, New York...	1.31	1.31	1.36	1.86	
Tank plates, Pittsburgh...	1.15	1.15	1.15	1.60	
Tank plates, New York...	1.31	1.31	1.31	1.76	
Beams, etc., Pittsburgh...	1.15	1.15	1.15	1.60	
Beams, etc., New York...	1.31	1.31	1.31	1.71	
Skelp, grooved steel, P'gh	1.20	1.20	1.20	1.45	
Skelp, sheared steel, P'gh	1.25	1.25	1.25	1.50	
Steel hoops, Pittsburgh...	1.25	1.25	1.25	1.60	
<b>Sheets, Nails and Wire.</b>					
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.	
Sheets, black, No. 28, P'gh	1.90	1.90	1.95	2.35	
Galv. sheets, No. 28, P'gh	2.85	2.90	2.95	3.50	
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.70	
Cut nails, Pittsburgh...	1.65	1.65	1.65	1.60	
Fence wire, base, P'gh...	1.40	1.40	1.40	1.60	
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.20	

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.



## Coke, Connellsville,

	Apr. 29, 1914.	Apr. 22, 1914.	Mar. 25, 1914.	Apr. 30, 1913.
Per Net Ton at Oven:				
Furnace coke, prompt...	\$1.85	\$1.85	\$1.85	\$2.00
Furnace coke, future...	2.00	2.00	2.00	2.25
Foundry coke, prompt...	2.40	2.40	2.40	3.00
Foundry coke, future...	2.50	2.50	2.65	3.00

## Metals.

Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	14.50	14.75	14.87½	15.75
Electrolytic copper, N. Y.	14.12½	14.25	14.50	15.62½
Spelter, St. Louis.....	4.85	5.00	5.12½	5.45
Spelter, New York.....	5.00	5.15	5.27½	5.60
Lead, St. Louis.....	3.80	3.70	3.87½	4.37½
Lead, New York.....	3.90	3.80	4.00	4.50
Tin, New York.....	34.60	35.60	38.50	49.87½
Antimony, Hallett's, N. Y.	6.75	6.75	6.75	8.12½
Tin plate, 100-lb. box, P'gh	\$3.30	\$3.30	\$3.30	\$3.60

## Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

## Extras

Cents per lb.

Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 8.	.15
Gauges under No. 8 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

Cents per lb.

I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Prices of the foregoing wire products to dealers in carload lots are 5c. higher. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	12½	13	14	15	16
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15	
Galvanized	2.05	2.05	2.10	2.15	2.25	2.35	2.75	2.85	

Wire Rods.—Bessemer, open-hearth and chain rods, \$26.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld					
Steel.			Iron.		
Inches	Black	Galv.	Inches	Black	Galv.
1½, 1 and ¾	73	52½	1½ and 1¼	66	47
1½	77	66½	¾	65	46
¾ to 3	80	71½	1½	69	56
			¾ to 2½	72	61
Lap Weld					
2	77	68½	1½	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53		2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55
Reamed and Drifted					
1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1½, lap	54	43
			1½, lap	45	34
			2, lap	66	56
			2½ to 4, lap	68	59
Butt Weld, extra strong, plain ends					
1½, 1 and ¾	68	57½	¾	63	52
1½	73	66½	1½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63
Lap Weld, extra strong, plain ends					
2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 and 8	63	53
			9 to 12	58	47
Butt Weld, double extra strong, plain ends					
1½	63	56½	1½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54
Lap Weld, double extra strong, plain ends					
2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from January 2, 1914, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1½ and 2 in.	61	1½ in.	45
2½ in.	58	1½ and 2 in.	49
2½ and 3 in.	64	2½ in.	45
3 and 3½ in.	69	2½ to 3 in.	54
3½ and 4½ in.	71	3 and 3½ in.	57
5 and 6 in.	64	3½ to 4 in.	60
7 to 13 in.	61	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.	
Nos. 3 to 8		1.35	
Nos. 9 to 10		1.40	
Nos. 11 and 12		1.45	
Nos. 13 and 14		1.50	
Nos. 15 and 16		1.60	

Box Annealed Sheets, Cold Rolled		Cents per lb.	
Nos. 10 and 11		1.55	
No. 12		1.55	
Nos. 13 and 14		1.60	
Nos. 15 and 16		1.65	
Nos. 17 to 21		1.70	
Nos. 22 and 24		1.75	
Nos. 25 and 26		1.80	
No. 27		1.85	
No. 28		1.90	
No. 29		1.95	
No. 30		2.05	

## Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11 .....	1.85 to 1.90
No. 12 .....	1.95 to 2.00
Nos. 13 and 14 .....	1.95 to 2.00
Nos. 15 and 16 .....	2.10 to 2.15
Nos. 17 to 21 .....	2.25 to 2.30
Nos. 22 and 24 .....	2.40 to 2.45
Nos. 25 and 26 .....	2.55 to 2.60
No. 27 .....	2.70 to 2.75
No. 28 .....	2.85 to 2.90
No. 29 .....	3.00 to 3.05
No. 30 .....	3.15 to 3.20

## Pittsburgh

PITTSBURGH, PA., April 29, 1914.

The dearth of new business in iron and steel products is getting worse. Steel works and manufacturing plants of all kinds are now running at a less rate of capacity than at any time since last December. The average is not above 60 per cent., if it is that high. While 1.15c., Pittsburgh, on shapes and bars is being pretty well maintained, this price has been shaded in some instances on plates. Line pipe has been reduced \$1 a ton, Bessemer and open-hearth billets and sheet bars have gone off fully \$1 a ton, and prices on galvanized sheets are lower, due partly to the slack demand and partly to the lower price of spelter. While it is hoped that a buying movement will develop before long, there are no signs of it. There is more pessimism in the steel trade to-day than at any time since 1907. The steel companies are seriously considering reductions in wages, and this may be done at any time.

**Pig Iron.**—A deal is under way involving a good quantity of basic iron which may be closed up in a day or two, and if this goes through it will be the first of importance in pig iron that has been made in this district for some time. Small lots of Northern foundry iron are being sold at prices ranging from \$13 to \$13.50 for No. 2, Valley furnace, the higher price being paid for makes which have a high reputation for quality. We note a sale of 250 tons of No. 2 foundry at the higher price. While practically no Bessemer or basic iron has been sold in this territory for some weeks, prices are quite firm. We quote: Bessemer, \$14; basic, \$13; No. 2 foundry, \$13 to \$13.50; gray forge, \$12.75 to \$13; malleable Bessemer, \$13.25, for delivery through first half of this year, all at Valley furnace, the freight rate to the Pittsburgh or Cleveland district being 90c. a ton.

**Billets and Sheet Bars.**—Practically no new demand has come out for either billets or sheet bars. Specifications from the sheet mills have fallen off materially, and as a result prices on both billets and sheet bars have gone off about \$1 a ton. We now quote Bessemer and open-hearth billets at \$20, and Bessemer and open-hearth sheet bars at \$21, f.o.b., makers' mills, Pittsburgh or Youngstown, for May and June delivery; forging billets, \$25 on desirable specifications, embracing only one size, and up to but not including 10 x 10 in., the regular extras being charged for larger sizes. On small orders forging billets are held at \$26. We quote axle billets at \$23 for desirable orders and \$24 for small orders.

**Muck Bar.**—No sales are reported. We quote best grades, made from all pig iron, at nominally \$27.50 delivered to buyer's mills in the Pittsburgh district.

**Steel Rails.**—No important orders for standard sections are being placed, current business being for small lots only. The traction companies are buying some fair-sized lots of standard sections, but their business this year has been much lighter than usual. The new demand for light rails is not heavy, the trouble in the coal-mining districts having shut off a good deal of business. We quote splice bars at 1.50c.; standard section Bessemer rails, 1.25c.; open-hearth standard sections, 1.34c., f.o.b. Pittsburgh. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots, these prices might be slightly shaded.

**Plates.**—No important orders for steel cars were placed the past week, and no new inquiries of moment have come out. The two local steel car shops are

short of work and not running to more than 20 or 25 per cent. of capacity. All the plate mills are badly in need of orders, none running to over 50 per cent., and some at a less rate. We quote ¼-in. and heavier plates at 1.15c., f.o.b. Pittsburgh, but it is stated that this price has been shaded 50c. to \$1 a ton on some recent orders.

**Structural Material.**—New inquiries are light. The Jones & Laughlin Steel Company has taken 350 tons for a new building for the Jersey Cereal Company, Linden Cross, Pa. A contract for about 3500 tons of structural steel is reported to have been placed with a local interest, but details are not yet ready. We quote beams and channels up to 15-in. at 1.15c., f.o.b. Pittsburgh.

**Iron and Steel Bars.**—New orders for both iron and steel bars are light and only for small lots. The mills report that specifications from large consumers, notably the implement makers and wagon builders, are much smaller than usual at this season. The demand for concrete reinforcing bars is active. We quote steel bars at 1.15c. to 1.20c. and common iron bars at 1.30c. to 1.35c., f.o.b. makers' mills, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¼-in. and over, \$1; ½ to 1 1/16 in., \$1.50; under ½ in., \$2.50 per net ton. These extras are not always observed, and mills that roll steel bars from old rails sometimes entirely omit them.

**Ferroalloys.**—There is no new demand for either ferromanganese or ferrosilicon, consumers being well covered. English 80 per cent. ferromanganese is held at \$39, Baltimore, but this price would be shaded 50c. to \$1 a ton if any new business was offering. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$19.50; 11 per cent., \$20.50, and 12 per cent., \$21.50, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegelisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

**Wire Rods.**—The statement in this report last week that all contracts for rods placed by Canadian consumers in this country prior to June 6 will be admitted free of duty into Canada up to June 30, should have read prior to April 6. There is little new demand for rods, most consumers being well covered and in many cases have not taken out the full tonnage required in their contracts. We quote Bessemer, open-hearth and chain rods nominally at \$26, Pittsburgh, for small lots, but if any large business came into the market a shade less could be done.

**Skelp.**—The new demand is light, owing to the fact that the pipe mills are not running to over 50 or 60 per cent. of capacity. Prices are only fairly strong. We quote: Grooved steel skelp, 1.20c. to 1.25c.; sheared steel skelp, 1.25c. to 1.30c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to consumers' mills in the Pittsburgh district.

**Sheets.**—The low prices ruling for spelter, which has sold at 4.90c. or less, East St. Louis, are partly responsible for the lower prices now quoted on galvanized sheets. The new demand for both black and galvanized sheets is quiet, and only for small lots. Specifications against contracts are not active, and the sheet mills are running at a less rate of capacity than for some time. The price of 1.90c. on black sheets is being shaded here and there about \$1 a ton. On galvanized sheets, in exceptional cases, 2.80c. has been done. Sheet mills are not operating to more than 50 per cent. of capacity, and will soon be running at a lower rate unless the demand improves. We quote Nos. 9 and 10 blue annealed sheets at 1.40c.; No. 28 Bessemer black sheets, 1.90c.; No. 28 galvanized, 2.85c.; No. 28 tin mill black plate, H. R. and A., 1.90c.; Nos. 29 and 30, 1.95c. These prices are f.o.b., Pittsburgh, in carload lots, jobbers charging the usual advances for small lots from store.

**Tin Plate.**—While some mills report specifications as active as ever, others state that there has been a falling off. The leading interest reports that last week was the heaviest in specifications that it has had for some time. Some inquiry is coming out, and a material

increase in new business is looked for within the next 60 days, to come from consumers who find they have not bought enough. Most of the leading makers are running full. On the small current orders going we quote 100-lb. cokes at \$3.30 to \$3.40 and 100-lb. ternes at \$3.20 to \$3.30, per base box, f.o.b., Pittsburgh.

**Wire Products.**—The new demand is dull. Practically all the shipments going out from the mills are on old contracts, placed when prices were lower. On some of these contracts deliveries have been extended, as jobbers did not have the demand from their customers to take out the material in the time specified. On the small amount of new business being placed, \$1.60 on wire nails and \$1.40 on plain annealed wire are stated to be generally observed, but in some districts, notably at Ohio River points, these prices are slightly shaded. We quote: Wire nails, \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all per 100 lb., f.o.b. Pittsburgh, with actual freight charge to point of delivery, terms being 30 days net less 2 per cent. off for cash in ten days. We quote cut nails at \$1.65, f.o.b. Pittsburgh. Discounts on woven wire fencing are 73½ per cent. off in carload lots, 72½ per cent. off on 1000-rod lots and 71½ per cent. on less than 1000-rod lots, all f.o.b. Pittsburgh.

**Hoops and Bands.**—New buying is light and only for small lots, as consumers have covered to July. Specifications are only fair. We quote steel bands at 1.15c., with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh. The price on steel hoops is weak.

**Shafting.**—The new demand continues quiet. Specifications from the implement trade and from automobile builders are very unsatisfactory. We quote cold-rolled shafting at 65 per cent. off, and in small lots from 62 to 64 per cent. off, delivered in base territory, depending on the order.

**Merchant Steel.**—Mills report the new demand dull, and only for small lots. Specifications from large consumers, like the implement trade and wagon builders, are lighter in volume at this time than for some years. Prices are not strong, and on small lots are about as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ¾ and 1 in., 1.80c. to 1.90c.; 1½ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

**Spikes.**—The few orders being placed are mostly for carloads and smaller lots. The railroads are not specifying freely on the contracts they awarded early in the year. We quote standard sizes of railroad spikes at \$1.40 to \$1.45 and small railroad and boat spikes at \$1.50 to \$1.55 per 100 lb., f.o.b. Pittsburgh.

**Standard Pipe.**—Some new inquiry has developed for line pipe. The Logan Natural Gas Company of this city has placed 7 miles of 12-in. and 7 miles of 16-in. with a local mill. The Ohio Fuel Supply Company is in the market for 25 miles of 16-in. for a natural gas line. The current demand for iron and steel pipe is dull and the mills are cutting down output. The Benwood works of the National Tube Company at Wheeling will be closed this week for an indefinite period for lack of orders. As noted before, several large projects involving a heavy tonnage of large sizes of pipe are being talked of, but it will likely be some time before they actually develop and the inquiries come out. The National Tube Company and other mills have increased discounts on line pipe one-half point, equal to a reduction of about \$1 a ton. No change was made in oil-well supplies or casing.

**Boiler Tubes.**—The new demand for boiler and merchant tubes in both iron and steel is dull. None of the mills that make tubes is running more than 50 per cent., if that much, and discounts are being more or less shaded, depending on the order.

**Old Material.**—While the scrap market is dull, prices are without material change. Consumers have a good deal coming to them on old contracts, but they are not taking it in very freely. Bundled sheet scrap is a little firmer, while borings have gone off about 25c. a ton. A sale is reported of 750 tons of selected heavy steel scrap to a Sharon consumer at about \$12, delivered; also a sale of 200 tons of cast-iron borings at \$7.50, delivered. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$12.00 to \$12.25
Ordinary steel melting scrap	11.50 to 11.75
Compressed side and end sheet scrap	10.50 to 10.75
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.75 to 9.00
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.50 to 14.75
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.50 to 7.75
Old carwheels	11.25 to 11.50
Cast-iron borings	7.50 to 7.75
Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

†Shipping point.

**Coke.**—Blast furnaces whose contracts expire in June have made some inquiries for last half, but no business has been closed. A number of blast furnaces have gone out in the past month, and the consumption of furnace coke has been cut down materially. This has resulted in a large number of ovens in the Connellsville regions being blown out. We quote standard makes of blast furnace coke for spot shipment at \$1.85 to \$1.90 per net ton at oven. Several of the leading makers of standard furnace coke are holding it at \$2 a ton on contracts. We quote standard 72-hr. foundry coke at \$2.40 to \$2.50 per net ton at oven to consumers. The Connellsville Courier reports the output of coke in the Upper and Lower Connellsville regions for the week ended April 18 as 334,655 net tons, a decrease over the previous week of over 20,000 tons.

## Chicago

CHICAGO, ILL., April 28, 1914.

It is difficult to recall a situation in which the makers and users of iron and steel products were more at sea regarding the immediate future of the business situation. Apathy prevails in every direction. Except for the inquiry which the city of Chicago has out on steel work for a municipal pier, there is really no tonnage of moment in hand or in sight. This pier is expected to call for about 6600 tons. Contracts for other fabricated steel jobs total about 2000 tons. A few scattering sales of rails are noted. The market for shapes, plates and bars is flatly at 1.15c., Pittsburgh, and without any improvement as to concessions for desirable tonnage. Sheet prices have suffered markedly as a result of keen competition for the business offered. A distinctly buyer's market has again developed with respect to bar iron and considerations of cost seem once more wholly submerged. The tonnage coming into the market in the form of specifications is meagerness itself. A brief period of activity in the local scrap market gave a touch of color to an otherwise drab background, but the pig-iron situation is almost wholly devoid of interest.

**Pig Iron.**—Comment about the pig-iron market must necessarily concern other things than buying and selling, for of these there is not sufficient to warrant even idle gossip. Prices both from Northern and Southern furnaces remain unchanged. On the basis of \$14.25 f.o.b. Lake furnace and \$10.50 at Birmingham for No. 2 foundry irons, no inquiry of importance has come to light. The following quotations are for iron



delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	14.75 to 15.00
Northern coke foundry, No. 2	14.25 to 14.75
Northern coke foundry, No. 3	14.00 to 14.25
Southern coke, No. 1 f'dry and 1 soft	15.35 to 15.85
Southern coke, No. 2 f'dry and 2 soft	14.85 to 15.35
Southern coke, No. 3	14.35 to 14.85
Southern coke, No. 4	13.85 to 14.35
Southern gray forge	13.35 to 13.85
Southern mottled	13.10 to 13.35
Malleable Bessemer	14.25 to 14.50
Standard Bessemer	17.00
Basic	13.75 to 14.25
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

**Rails and Track Supplies.**—Some encouragement has been taken from the placing during the week of several small lots of rails, including one for 500, one for 1000 and one for 1200 tons, as well as proportionate quantities of spikes and bolts, for immediate delivery. The hopeful aspect about these orders is the evidence they offer that the railroads are in real need of the materials for which the mills are so anxious to receive rolling instructions. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$26 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

**Structural Material.**—The municipal pier for which the city of Chicago will receive figures on April 30 is expected to require about 6600 tons. Aside from this the work in prospect has no great importance. Contracts awarded last week include 250 tons to the Modern Steel Structural Company for the Pacific Aerospace Company, San Francisco; 299 tons to the Morava Construction Company for the University of Chicago; 379 tons to the Missouri Valley Bridge & Iron Company for the Kansas City Stock Yard Company; 142 tons to the Virginia Bridge & Iron Company for the receivers of the Frisco System; 400 tons to the Ralston Iron Works for a bank building at Stockton, Cal.; 286 tons to the Missouri Valley Bridge & Iron Company for the Unecda Bridge Company, Austin, Tex., and 368 tons to Frankman Brothers, Minneapolis, for the Duluth, South Shore & Atlantic Railroad. While some of the Eastern mills continue to report the taking of carload business on the basis of 1.20c., Pittsburgh, almost any order can be placed at prices equivalent to 1.15c. Both new business and specifications are exceedingly light. We quote for Chicago delivery, from mill, for plain shapes, 1.33c.

We quote for Chicago delivery, out of store, 1.75c.

**Plates.**—Tonnage is still lacking to support this market as regards plates. The single item of interest is the taking of figures this week by the Illinois Central on 3000 box cars. The closeness with which users are able to buy is represented by the extent of the concessions they are able to secure, from the basis of 1.33c., Chicago. For ordinary business we quote, for Chicago delivery, from mill, 1.33c.

For Chicago delivery of plates from store we quote 1.75c.

**Sheets.**—Although the sheet mills do not appear to be aggressively seeking business, every inquiry is the occasion for the keenest competition. As a result prices have suffered severely, particularly for galvanized sheets, the strength of which is undermined by the low price of spelter. The general market is about 1.90c., Pittsburgh, for black sheets and close buyers are able to do 1.85c. Beyond that concessions are matters involving a sacrifice of freight advantage. There appear to be fewer irregularities in blue annealed sheets. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.53c.; No. 28 black, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

**Bars.**—Failing to secure business in the brief period of firmness during which the local bar-iron mills ad-

vanced prices as high as 1.17½c., they are again meeting the buyers' views as to price and sales have been made at 1.10c. in a number of instances. Even at this level there is no evidence of greater firmness. Merchant mills still have a fair tonnage of steel bars on their books, but new business is lacking in features of interest. We quote for mill shipments as follows: Bar iron, 1.10c. to 1.15c.; soft steel bars, 1.33c.; hard steel bars, 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

**Rivets and Bolts.**—The trade in these products is purely routine. Makers of rivets, while they have a fair amount of business in hand, are unable to take a stand for more profitable prices. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to ¾ x 4 in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, ½ to 1½ in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.55c.; machine bolts up to ¾ x 4 in., 75-10; larger sizes, 70-10-5; carriage bolts up to ¾ x 6 in., 75-5; larger sizes, 70-10 off; hot pressed nuts, square head, \$6.00, and hexagon, \$6.70 off per cwt.

**Old Material.**—The price of heavy steel continues to reflect the influence of buying in this market for the account of the principal consumer. Several grades of material, in fact, developed a degree of activity during the week and small advances in quotations are noted accordingly. At the end of the week such strength as appeared earlier had largely disappeared. Turnings were also held at somewhat higher figures. This condition arises not so much because of an improved demand but is an indication of the premium, rolling mills are being asked to pay where this material is to be diverted from steel furnace consumption. The market as a whole is very restricted in its activity. There were practically no new offerings of railroad scrap. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$12.75 to \$13.25
Old steel rails, rerolling	11.50 to 12.00
Old steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.50 to 11.75
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards, cut apart	10.25 to 10.75
Shoveling steel	9.50 to 9.75
Steel axle turnings	6.75 to 7.25

Per Net Ton	
Iron angles and splice bars	\$12.25 to \$12.75
Iron arch bars and transoms	12.25 to 12.75
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.75 to 9.00
Steel knuckles and couplers	9.25 to 9.75
Steel springs	9.50 to 10.00
Locomotive tires, smooth	10.00 to 10.25
Machine shop turnings	5.25 to 5.75
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	10.25 to 10.50
Stove plate and light cast scrap	9.50 to 9.75
Grate bars	9.00 to 9.50
Railroad malleable	9.25 to 9.75
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.75 to 7.25

**Hoops and Bands.**—New business in these products is meager and specifications are light. The placing of some carload orders for shipment at once and a lot of 300 tons for delivery in 60 days are noted. Concessions do not seem to be as radical in these lines as are reported for other forms. We quote for Chicago delivery of bands, 1.33c. to 1.38c., and for hoops, 1.43c. to 1.48c.

**Wire Products.**—The demand for manufacturers' wire continues almost insistent and some of the independent mills are still five and six weeks behind in their deliveries. Wire nails are still below par in volume of

shipments while fencing tonnage is hardly better than fair. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.13, all Chicago.

**Cast-Iron Pipe.**—The contract for 200 tons of pipe at Jackson, Mich., was awarded to the Lynchburg Foundry Company. At Carpentersville, Ill., an award of 400 tons has been made. Bids are being received at Cincinnati on 2700 tons of 24-in. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

## Philadelphia

PHILADELPHIA, PA., April 28, 1914.

In all materials and finished products the market is spotty and unsatisfactory. The attitude of furnace and mill representatives is one of waiting, and this they would do with far more than present comfort if they could discern any encouragement in the outlook. Some indication as to when the present uncertainty of the country will terminate would do wonders in bolstering up sentiment. When war with Mexico seemed imminent the circumstance was seized as affording a stimulus to the iron and steel trade, much as war was deprecated. But this possible activity which was to be so dearly bought has dissolved with the general uncertainty. With it all, hints of labor trouble are heard. Pig iron is no more active, but prices hold up which they might be expected to do in view of recent demonstrations of costs. The market for structural material is wide open at 1.15c., Pittsburgh, with plates and bars on the same level, and steel mills do not care to enter second half contracts. Old material is practically nominal.

**Pig Iron.**—The bulk of sales and inquiries—and the aggregate of either is not large—continues to involve mostly quantities ranging from 25 to 100 tons, with an occasional transaction in which more than the latter amount enters and the larger transactions stand out with much prominence. In totaling up all its sales for the week, one representative firm finds that the sum was about equal to the business of one good day in active times. The largest inquiry before the trade is one put out by a Delaware River cast-iron pipe company, which asks for estimates on 1500 tons of No. 3 foundry iron and 1500 tons of gray forge, May and June delivery. A Trenton iron works is inquiring for 200 tons of No. 2 plain. These inquiries as regards size, head the list of requests for estimates, other inquiries, mostly for carloads, are for No. 2X, charcoal and special irons. Sales included 1000 tons of charcoal iron for third quarter delivery to a central Pennsylvania buyer at the full price. A Trenton firm is believed to have closed on at least 1000 and possibly 2000 tons of malleable. Another purchaser, a machinery manufacturer of Wilmington, took 1500 tons of No. 2X and No. 2 plain for nearby delivery. There also was sold 1000 tons of Lebanon low phosphorus at \$17.50, delivered. Virginia irons are even less active than Northern brands, and requests to withhold delivery are becoming more frequent. One large Pennsylvania producer which sells its surplus has sold only half of its production for the month, although it has plenty of orders on its books to ship against. Prices are unimpaired as a rule, \$15 being the minimum for eastern Pennsylvania No. 2X, although one or two brands could be bought at perhaps 25c. off. The following range of prices about represents the market for near delivery in buyers' yards in this district, with the minimum probably more general:

Eastern Penna. No. 2 X foundry	\$15.00 to \$15.25
Eastern Penna. No. 2 plain	14.75 to 15.00
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	14.00
Basic	14.25
Standard low phosphorus	21.00

**Iron Ore.**—Imports in the week ended April 25 were light, amounting to but 9900 tons of Cuban ore. New business is nil, as might be expected under existing conditions. Now that transportation on the Great

Lakes is being resumed, the trade is hoping to get some word of action on Lake ore prices.

**Ferroalloys.**—No interest has developed, and prices are without change at \$39, seaboard, for English 80 per cent. ferromanganese and \$38 for German. Quotations for 50 per cent. ferrosilicon are \$71 to \$73, Pittsburgh, according to quantity. The carload of 11 per cent. ferrosilicon, referred to a week ago, has been purchased.

**Cast-Iron Pipe.**—While the pipe foundries hereabouts are running fairly full, new business running into good tonnage is lacking. Business in the South is reported as poor and not really good in other sections, but bond issues in various cities and towns point to increased expenditure before long for water supply purposes. While price cutting is not entirely over, steadiness is probably a little nearer. The average quotation for 6-in. pipe is about \$21.50 per net ton, standard weight, in carload lots, at the foundry, with 4-in \$2 higher, and larger sizes 50c. less.

**Billets.**—Inquiries are few and for small lots. Prices are weaker, in keeping with the easier base at Pittsburgh. Consumers of billets who are feeling the decline in the prices of their products have asked for price concessions, which in some cases have been turned down with not a little emphasis, the steel makers declaring that they would rather close their mills than accept the price offered. For open-hearth billets, quotations are \$22.40 to \$23.40, according to specifications, with forging steel running \$4 to \$5 per ton higher.

**Structural Material.**—The recent flurry has passed, and minor propositions are all that are discernible in a market of extreme quiet. The running of one Eastern mill four days a week and single turn is indicative of the situation. The Delaware, Lackawanna & Western Coal Company has asked for revised bids on its coal breaker, which is to be erected near Wilkes-Barre and will take about 1000 tons. The general quotation is 1.30c., Philadelphia.

**Plates.**—Small and miscellaneous orders make up the present unsatisfactory trend of business. There is nothing in prospect promising a good demand. Plates can be had at 1.30c., Philadelphia, in any reasonable quantity, and desirable business might be taken at least 2½ points lower. It is only in small lots that 1.35c., Philadelphia, is done.

**Bars.**—The demand for iron bars is light at 1.12½c. to 1.17½c., mill, or 1.20c. to 1.25c., Philadelphia. For steel bars, which are quoted at 1.30c., Philadelphia, there are occasional inquiries only and they are not of enough importance to single out for mention.

**Sheets.**—The general weakness has affected sheets. While the shading of prices is not general, desirable specifications would bring out lower than 1.55c., for No. 10 blue annealed, which has been the base for some time. Probably 1.50c., could be done.

**Old Material.**—The entire market is more or less nominal. What little buying is reported has been in carload lots. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35, per gross ton:

No. 1 heavy melting steel	\$10.75 to \$11.60
Old steel rails, rerolling	12.25 to 12.75
Low phosphorus heavy melting steel	
scrap	14.50 to 15.00
Old steel axles	14.50 to 15.00
Old iron axles	21.00 to 22.00
Old iron rails (nominal)	15.50 to 16.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.00 to 13.50
Wrought-iron pipe	10.25 to 10.75
No. 1 forge fire	8.50 to 9.00
Bundled sheets	8.50 to 9.00
No. 2 light iron	5.00
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Grate bars, railroad	8.50 to 9.00
Stove plate	8.75 to 9.25
Railroad malleable (nominal)	9.00 to 9.50

**Coke.**—Standard Connellsville furnace coke is quiet at \$1.90 per net ton at oven for prompt and \$2 on contract. Connellsville foundry coke is about \$2.50 per net ton at oven. Freight rates to this city from the producing districts are as follows: Connellsville, \$2.05; Mountain, \$1.65; Latrobe, \$1.85.



## Cincinnati

CINCINNATI, OHIO, April 29, 1914.—(By Wire.)

**Pig Iron.**—The reported impending purchase of 10,000 tons of basic in St. Louis territory for last half shipment is probably the most interesting item given out by iron merchants. Local and nearby sales are confined to carload lots and there is practically no forward buying of foundry iron. Consumers are awaiting developments. While it is generally believed that present stagnant conditions cannot exist for any extended length of time there is no tendency among buyers to cover last half requirements. Operating at the current low standard of capacity much foundry iron will have to be purchased to carry melters through the remainder of the year, but inquiries now received for any quantity over 100 tons are somewhat skeptically considered as bids for information as to market conditions. The most extended sale reported was made to a northern Ohio consumer, who bought 500 tons of Southern No. 2 for July-December shipment. It is reported that producers in the Lake district and in southern Ohio are seriously considering curtailing production until there is some improvement in both the demand and prices. No changes in quotations have been made, but it is rumored that a small quantity of Southern iron was recently bought at \$10.50, Birmingham basis, for shipment through the remainder of the year. There is no inquiry for malleable and no sales have been made lately in this territory. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$14.25 to \$14.75
Southern coke, No. 2 f'dry and 2 soft.	13.75 to 14.25
Southern coke, No. 3 foundry.	13.25 to 13.75
Southern No. 4 foundry.	12.75 to 13.25
Southern gray forge	12.25 to 12.75
Ohio silvery, 8 per cent. silicon.	17.20 to 17.70
Southern Ohio coke, No. 1.	15.70 to 16.20
Southern Ohio coke, No. 2.	14.70 to 15.20
Southern Ohio coke, No. 3.	14.45 to 14.70
Southern Ohio malleable Bessemer.	14.70 to 15.20
Basic, Northern	14.70 to 15.20
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

**Finished Material.**—The market shows no improvement, with the possible exception of a limited quantity of reinforcing concrete bars that were bought in this territory lately. Sheets are holding up fairly well, the demand for galvanized sheets appearing to be ahead of any other class of finished metal products. However, prices are no firmer. Mill agents report that the railroad supply line, as a rule, is very quiet. Track supplies are only bought in quantities to take care of immediate needs. Store quotations on steel bars are 1.75c. to 1.80c. and on structural material 1.85c. In carload lots, No. 28 black sheets remain around 2.05c. and galvanized 3.05c., f.o.b. Cincinnati and Newport, Ky.

**Old Material.**—Practically no business has been transacted the past week. The foundries are not buying any scrap, and the rolling mills are only drawing on contracts previously made. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	\$7.00 to \$7.50
Old iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up.	20.00 to 20.50
Rerolling steel rails	11.00 to 11.50
Melting steel rails	9.50 to 10.00
Old carwheels	10.50 to 11.00
Per Net Ton	
No. 1 railroad wrought	\$9.00 to \$9.50
Cast borings	4.75 to 5.25
Steel turnings	4.75 to 5.50
Railroad cast scrap	9.50 to 10.00
No. 1 machinery cast scrap.	10.50 to 11.50
Burnt scrap	6.25 to 7.00
Old iron axles	17.00 to 17.50
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	6.50 to 7.00
Malleable and steel scrap.	7.50 to 8.00
Railroad tank and sheet scrap.	5.50 to 6.00

**Coke.**—Furnace operators in southern Ohio are reported not over-anxious about the delivery of coke contracted for, although there has been no late appreci-

able decrease in the amount consumed in that district. Foundry coke is very dull, and this market is likely to be somewhat stagnant until the foundries resume operations on a more nearly normal basis. We quote Connellsville 48-hr. brands around \$1.85 for prompt and \$2 for future, per net ton at oven, with Wise County and Pocahontas brands a trifle higher. Foundry coke in all three districts is quoted at \$2.50 at oven for prompt shipment, with 25c. a ton added for last half shipment.

## Cleveland

CLEVELAND, OHIO, April 28, 1914.

**Iron Ore.**—Buyers and sellers continue to play a waiting game and the uncertainty about prices continues. Ore shippers are having trouble in getting cargoes for their own boats and there will be little business for outside boats for some time. The first boats of the Pittsburgh Steamship Company sailed Monday. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Messaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Messaba non-Bessemer, \$3.40.

**Pig Iron.**—A St. Louis steel company has an inquiry out for about 10,000 tons of basic iron for delivery during the next five months. The market is lifeless in this immediate territory, although some foundry iron inquiry has sprung up from outlying districts and a few inquiries continue to come from far eastern points. While the foundry situation has not improved, consumers generally are taking all the iron they have bought. Although there has not been enough business recently to test the market, sellers seem disposed to hold prices at the recent level. The importation of English hematite has had some effect on Eastern prices on low phosphorus iron, but these importations have not effected low phosphorus prices further west. A few small lot sales of Southern iron for spot shipment are reported at \$10.50 Birmingham for No. 2. We quote delivered Cleveland as follows:

Bessemer	\$14.90
Basic	\$13.90 to 14.00
Northern No. 2 foundry.	14.25
Southern No. 2 foundry	14.85
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon.	17.55
Standard low phosphorus Valley Furnace	20.50 to 20.75

**Coke.**—Many consumers are holding back on shipments of foundry coke, resulting in a surplus on the market and more ovens will probably be blown out. Producers are asking \$2.05 to \$2.15 for standard furnace coke for the last half. For earlier delivery quotations range from \$1.85 to \$1.95. The better grades of foundry coke are held at \$2.50 to \$2.75.

**Finished Iron and Steel.**—While the demand in finished lines is quiet, conditions are no worse than they have been and one or two of the mills report a slight improvement in current orders. Mills are adhering firmly to 1.15c., Pittsburgh basis, on bars and structural material. The 1.15c. price for plates is being maintained by the larger mills, but some of the small mills are shading this price \$1 a ton. Business has improved in a local plate mill, which now has orders to keep it running full about five weeks. Practically no specifications for steel bars are coming from the implement trade. The demand for bar iron is very dull and both the local mills are shut down. Quotations on bar iron are 1.20c. to 1.25c. Cleveland, but the market is weak. The structural situation shows some improvement. A fair amount of work is being figured on and contracts have been placed as follows: Bridge at Lorain, 305 tons, and three bridges at Barberton, Ohio, 150 tons, to the American Bridge Company; Gordon apartment house, Cleveland, 150 tons, to the Stevens Iron Works & Fireproofing Company; bridges for the Lake Shore Railroad, 800 tons to the Mt. Vernon Bridge Company. The Childers Construction Company, Columbus, was low bidder for 500 tons for a bridge in Zanesville. The John F. Casey Company, Pittsburgh, has the contract for the filtration plant in Cleveland. Charles Fath & Co., the low bidder, having declined to take the contract. This plant will require 2100 tons of soft steel bars for reinforcing. There is little activity



in the sheet market, but some mills are able to take orders at 1.90c. for No. 28 black and 2.90c. for No. 28 galvanized. However, some of the mills are shading these prices \$1 a ton. We quote warehouse prices at 1.80c. for steel bars and 1.90c. for plates and structural material.

**Bolts and Rivets.**—New demand for bolts is not active. Rivet specifications are holding up fairly well. Prices are unchanged at 1.55c. for structural and 1.65c. for boiler rivets for desirable orders. We quote discounts as follows: Common carriage bolts,  $\frac{3}{4}$  x 6 in. smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer, 75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts; blank or tapped, \$6 off; hexagon,  $\frac{3}{4}$  in. and larger, \$7.20 off; 9-16 in. and smaller, \$7.80 off; semi-finished hexagon nuts,  $\frac{3}{4}$  in. and larger, 85, 10 and 5 per cent.; 9-16 in. and smaller, 85, 10, 10 and 5 per cent.

**Old Material.**—Youngstown mills have purchased considerable scrap in the past few days, mostly in heavy melting steel, which brought prices of about \$11.75 to \$12.25. Locally the market is extremely dull. Only one consumer is taking scrap freely. The embargo which has been on at the Upson plant for several weeks is expected to be lifted in a few days. Most quotations are unchanged, although iron axles have declined about \$1 a ton and cast scrap and stove plate are weaker. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Old steel rails, re-rolling.....	\$11.50 to \$12.00
Old iron rails.....	13.50 to 14.00
Steel car axles.....	15.00 to 15.25
Heavy melting steel.....	10.50 to 11.00
Old carwheels.....	11.50 to 12.00
Relaying rails, 50 lb. and over.....	23.00 to 25.00
Agricultural malleable.....	8.50 to 9.00
Railroad malleable.....	10.75 to 11.00
Light bundled sheet scrap.....	7.50 to 8.00

Per Net Ton	
Iron car axles.....	\$17.25 to \$18.25
Cast borings.....	5.75 to 6.25
Iron and steel turnings and drillings.....	5.50 to 6.00
Steel axle turnings.....	6.75 to 7.25
No. 1 busheling, new.....	8.75 to 9.00
No. 1 busheling, old.....	8.00 to 8.25
No. 1 railroad wrought.....	10.00 to 10.50
No. 1 cast.....	10.50 to 10.75
Stove plate.....	8.00 to 8.50

## St. Louis

ST. LOUIS, Mo., April 27, 1914.

**Pig Iron.**—Shipments under contract continue to be in full accord with the original allotments under the contracts and there is enough new business of the minor order appearing to show that the iron is being used and special quantities or special analyses for mixtures are at times required to meet needs. The market has been further heartened by the appearance of an inquiry for 10,000 tons of Northern basic which is likely to be sharply competed for. Another inquiry appearing was for 500 tons of Lake Superior charcoal iron for car-wheel purposes. No. 2 Southern is held here at \$11, Birmingham basis, on quotation. No. 2 Northern, Iron-ton basis, is about \$13.25 and No. 2 X Chicago, \$14 to \$14.50.

**Coke.**—Demand is for small lots and few in number. By-product coke is quoted at about \$5.30, St. Louis delivery.

**Finished Iron and Steel.**—The business moving continues in small lots for immediate shipment and the orders demonstrate that there are little or no stocks on hand. Inquiry shows that prices for structural material are in no case below 1.15c. Pittsburgh, and in some cases for immediate shipment 1.20c. is no barrier. The only car inquiry reported for this territory is one of 150 for the Kansas City Southern. In standard section steel rails the Wabash made a purchase of 2000 tons divided between two interests, and the Missouri Pacific began to talk about 10,000 tons, but this is thought not likely to develop into a contract until the

road's finances are settled. The recent Frisco transaction of 6000 tons has been formally closed.

**Old Material.**—Recent lists of the railroads are believed to have been held by the roads to come out again when demand is better. Dealers are doing no trading on their own account and none of the consuming interests is taking anything more than the minimum on their contracts. There is not enough business to make quotations and the figures given are purely nominal. We quote, therefore, dealers' prices f.o.b. St. Louis, with the reservation noted:

Per Gross Ton	
Old iron rails.....	\$10.75 to \$11.25
Old steel rails, re-rolling.....	10.50 to 11.00
Old steel rails, less than 3 feet.....	10.50 to 10.75
Relaying rails, standard section, subject to inspection.....	21.00 to 23.00
Old carwheels.....	10.50 to 11.00
No. 1 railroad heavy melting steel scrap.....	9.75 to 10.25
Shoveling steel.....	8.25 to 8.75
Frogs, switches and guards cut apart.....	9.75 to 10.25
Bundled sheet scrap.....	4.50 to 5.00

Per Net Ton	
Iron angle bars.....	\$10.25 to \$10.75
Steel angle bars.....	8.50 to 9.00
Iron car axles.....	16.75 to 17.25
Steel car axles.....	11.75 to 12.25
Wrought arch bars and transoms.....	11.25 to 11.75
No. 1 railroad wrought.....	7.75 to 8.25
No. 2 railroad wrought.....	7.50 to 8.00
Railroad springs.....	8.75 to 9.25
Steel couplers and knuckles.....	8.75 to 9.25
Locomotive tires, 42 in. and over, smooth.....	9.00 to 9.50
No. 1 dealers' forge.....	7.25 to 7.75
Mixed borings.....	3.25 to 3.75
No. 1 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	5.50 to 6.00
No. 1 cast scrap.....	9.25 to 9.75
Stove plate and light cast scrap.....	7.75 to 8.25
Railroad malleable.....	7.50 to 8.00
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	5.50 to 6.00
Railroad sheet and tank scrap.....	5.75 to 6.25
Railroad grate bars.....	6.75 to 7.25
Machine shop turnings.....	4.25 to 4.75

## Birmingham

BIRMINGHAM, ALA., April 27, 1914.

**Pig Iron.**—One company sold about 1000 tons during the week at \$11 and below, specific figures for grades being unobtainable. Others report a dearth of business. The iron output of Alabama is now represented by 17 active stacks, of which 6 are on basic. The Woodward furnace which sustained an accident is still out, but a Sloss-Sheffield stack at Sheffield which has been idle for some time, it is understood, is to be blown in this week, giving the company four active ones again. The railroad buying is exceedingly scanty and this makes it difficult to keep steel plants in operation. The 50 per cent. rate of operating is still on and billets are piling high in the yards. The probability is, however, that the steel plants will not be obliged to curtail operations further than is now the case and hence will keep their forces intact. It was with considerable surprise that at the close of the month of March it was ascertained that pig-iron stocks in Alabama furnace yards had diminished by about 25,000 tons, the decrease being represented by 7000 tons of foundry and the rest basic. The heavy orders for basic booked by the leading interest early in the year are responsible for a portion of the movement. Stocks will probably be increased this month. Foundries are not working at over 50 per cent. of capacity. We quote, per gross ton, f.o.b. furnaces, as follows:

No. 1 foundry and soft.....	\$11.00 to \$11.50
No. 2 foundry and soft.....	10.50 to 11.00
No. 3 foundry.....	10.00 to 10.50
No. 4 foundry.....	9.75 to 10.25
Gray forge.....	9.50 to 10.00
Basic.....	10.25 to 10.75
Charcoal.....	23.25 to 23.75

**Cast-Iron Pipe.**—No improvement is seen in the pipe situation. Some pits have been closed down, as expected municipal contracts did not mature. Operations are from 50 to 70 per cent. of capacity, with enough filling-in orders to prevent accumulations. The soil-pipe plants are still at work on regular spring trade, but anticipate an early return to less brisk conditions. We quote, per net ton, f.o.b. pipe yards, as follows: 4-in., \$21; 6-in. and upward, \$19, with \$1 added for gas pipe.

**Coal and Coke.**—The coal trade shows no gain. Operations are on a basis of 60 to 70 per cent., with a number of small mines closed down. The output is somewhat larger than it was a few weeks ago, but is still below normal. Coke is holding its own. The small production is finding an outlet in well-sustained prices, which are, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$3; foundry, \$3.25 to \$3.50.

**Old Material.**—Scrap is dull, in sympathy with pig iron and steel. Small quantities for immediate requirements represent all the business going. Nominal quotations, per gross ton, f.o.b. dealers' yards, remain as follows:

Old iron axles .....	\$14.50 to \$15.00
Old steel axles .....	14.50 to 15.00
Old iron rails .....	13.00 to 13.50
No. 1 railroad wrought .....	10.00 to 11.00
No. 2 railroad wrought .....	8.50 to 9.00
No. 1 country wrought .....	9.00 to 10.00
No. 2 country wrought .....	8.00 to 9.00
No. 1 machinery cast .....	9.50 to 10.00
No. 1 steel scrap .....	8.00 to 8.50
Tram carwheels .....	9.50 to 10.00
Standard carwheels .....	10.50 to 11.00
Stove plate .....	8.00 to 8.50

## Boston

BOSTON, MASS., April 28, 1914.

**Old Material.**—The dealers have little to say about the market. No intelligent estimate can be made on values here, for transactions between the collectors and producers and the large dealers, and between the dealers and the mills, have been reduced to about the lowest limit. Prices are wholly nominal. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel .....	\$8.25 to \$8.50
Low phosphorus steel .....	13.75 to 14.75
Old steel axles .....	13.25 to 13.75
Old iron axles .....	21.25 to 21.75
Mixed shafting .....	12.75 to 13.00
No. 1 wrought and soft steel .....	9.00 to 9.25
Skeleton (bundled) .....	5.75 to 6.25
Wrought-iron pipe .....	7.75 to 8.00
Cotton ties (bundled) .....	6.00 to 6.25
No. 2 light .....	3.75 to 4.25
Wrought turnings .....	5.00 to 5.50
Cast borings .....	5.00 to 5.50
Machinery, cast .....	11.25 to 11.50
Malleable .....	8.00 to 8.25
Stove plate .....	7.75 to 8.00
Grate bars .....	6.25 to 6.50
Cast-iron carwheels .....	11.00 to 11.25

## Buffalo

BUFFALO, N. Y., April 28, 1914.

**Pig Iron.**—New business totals not over 2000 tons, all grades, but inquiry seems to be coming out a little better than in recent weeks, although still rather light. It is an indication that buyers are reaching the point where they find it necessary to cover for further needs. Most producing interests report a fair volume of shipments going forward on contracts. Prices remain as follows, for first half shipment, f.o.b. Buffalo, 25c. per ton being added for Buffalo city delivery:

No. 1 foundry .....	\$14.00 to \$14.25
No. 2 X foundry .....	13.50 to 14.00
No. 2 plain .....	13.25 to 13.75
No. 3 foundry .....	13.00 to 13.25
Gray forge .....	13.00
Malleable .....	13.75 to 14.25
Basic .....	13.75 to 14.25
Charcoal, regular brands and analysis .....	15.75 to 16.75
Charcoal, special brands and analysis .....	20.50

**Finished Iron and Steel.**—The principal activity shown is for material going into building construction, reinforcing and corrugated bars and structural shapes. One selling interest reports a very good week for bars for manufacturing lines. Prices are being held as closely to 1.20c., Pittsburgh, as possible, but 1.15c. is reported on orders covering desirable specifications. Moderate business in steel sheet-piling is reported. The Great Lakes Dredging & Dock Company has received a \$230,000 contract from the United States Government for guide piers for Black Rock harbor, this city, for

which 160 tons of stay-bolts and screw-bolts will be required. The Monarch Engineering Company, Buffalo, has the general contract for the Connecting Terminal Railroad elevated, Blackwell Canal, Buffalo, taking about 600 tons of structural steel, 250 tons of corrugated bars and 350 tons of twisted bars. Bids will soon be taken on revised plans for the J. W. Clement Company printing plant, this city, involving 400 tons. Metz Bros., contractors, Buffalo, have the general contract for the Poppenberg store, office and loft building, Buffalo, taking 1100 tons. The American Bridge Company was low bidder for 2700 tons for rebuilding the Chicago street viaduct, Buffalo, and the Buffalo Structural Steel Company was low bidder for 200 tons for the Order of the Eagles, Buffalo.

**Old Material.**—Few transactions are reported. Borings and turnings lead, the trade in these commodities consisting of minor placements going into the Pittsburgh district. There has been no changes in prices. We quote as follows, per gross ton f.o.b. Buffalo:

Heavy melting steel .....	\$10.00 to \$10.50
Low phosphorus steel .....	14.50 to 15.00
Boiler plate sheared .....	11.50 to 12.00
No. 1 railroad wrought scrap .....	11.00 to 11.50
No. 1 railroad and machinery cast .....	11.50 to 12.00
Old steel axles .....	13.75 to 14.25
Old iron axles .....	21.50 to 22.00
Old carwheels .....	11.50 to 12.00
Railroad malleable .....	10.25 to 10.75
Machine shop turnings .....	5.50 to 6.00
Heavy axle turnings .....	7.50 to 8.25
Clean cast borings .....	6.00 to 6.50
Old iron rails .....	15.00 to 15.50
Locomotive grate bars .....	9.50 to 10.00
Stove plate (net tons) .....	9.75 to 10.00
Wrought pipe .....	7.50 to 8.00
Bundled sheet scrap .....	6.25 to 6.50
No. 1 busheling scrap .....	8.50 to 9.00
No. 2 busheling scrap .....	6.00 to 6.50
Bundled tin scrap .....	10.50

## New York

NEW YORK, April 29, 1914.

**Pig Iron.**—The pig iron inquiry heard of in local selling offices is more in eastern Pennsylvania territory than in that naturally tributary to New York City. Locally considerable interest is shown in the purchases of pig iron that will be made by the foundries securing contracts for the cast iron segments required for the two new East River subway extension tunnels. Bids on the tunnel construction will be taken May 22. Persistent reports of Buffalo iron being offered at \$13 to \$13.25 at furnace for No. 2 X foundry are considered traceable to some re-sale iron in the hands of dealers, which has figured in New England reports for several weeks. Inquiry is meager. Several small lots are mentioned in connection with New England and there is a report of one inquiry for several thousand tons from Connecticut which, however, seems to be identical with one of three weeks back which has since been withdrawn. A report of one basic iron purchase comes from eastern Pennsylvania, but there is no definite confirmation. The business is said to have been taken by an important seller which has been making large offerings of iron each month. Pending inquiry in this district involves deliveries for May and June and in some cases in the third quarter and second half. The tone of the market is certainly weaker, but the incentive to cut prices is less rather than greater, in the present indifferent state of the market. Furnacemen show no interest in ore, all having either considerable stock piles or outstanding contract obligations. We continue to quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15 to \$15.25; No. 2 X, \$14.75 to \$15; No. 2 plain, \$14.50 to \$14.75; Southern iron, \$15 to \$15.50 for No. 1 and \$14.75 to \$15 for No. 2.

**Finished Iron and Steel.**—Scarce are any evidences of improvement in this market. Some representatives insist that the situation has been a little better in April than it was in March and that business now is fair with a tendency to slight improvement. It was pointed out, however, that the present abnormal state in which very little can be done at almost any price cannot long endure and that a decided swing to normal conditions is inevitable. New undertakings are few and even decisions and projects already before the market are slow in materializing. In structural lines, only one

new inquiry was learned of and this a small one, namely, 160 tons of signal bridge work for the central Railroad of New Jersey. Since last week the Hay Foundry & Iron Works has been awarded contracts for two buildings: 900 tons for the Backer loft at Seventy-eighth street and Park avenue and 650 tons for the Hyman loft on Sixteenth street. The Levering & Garguies Company has also received contracts for two buildings: 450 tons for an apartment hotel at Fifty-ninth street and Fifth avenue and 900 tons for the Goelet loft on Nineteenth street. The Knickerbocker Club, 2 East Sixty-third street, 300 tons, is to be built by the Eastern Steel Company, while the 3000 tons for the plant of the Taylor-Wharton Iron & Steel Company, Easton, Pa., is to be furnished by the Lackawanna Bridge Company. Awards for steel cars have been very few since the comparatively large number contracted for last week. The American Car & Foundry Company is to build 50 coke cars for the Solvay Process Company and 1000 box cars for the Southern Railroad. At the close of April the number of cars under negotiation amounts to 6000 freight cars and 160 passenger, a few of which may be awarded before the end of the month. Of the passenger cars enumerated 107 are for the Union Pacific. While no decided weakening in prices was noted it is evident that competition for the small amount of business before the market is becoming keener. We quote mill shipments of steel bars, plates and structural materials at 1.15c., Pittsburgh, or 1.31c., New York, and iron bars at 1.22½c. to 1.27½c., New York.

**Ferroalloys.**—Sales of small lots of 80 per cent. ferromanganese constitute the only business moving in this market. Reports as to 50 per cent. ferrosilicon are that, while most of the sales made have been of small lots, business has been better in April than for some time. English 80 per cent. ferromanganese can be obtained at about \$39, seaboard, with the German product selling at \$38. There is no change in quotations for 50 per cent. ferrosilicon, carloads being obtainable at \$73, Pittsburgh; 100 tons at \$72, and 600 tons and over at \$71.

**Cast-Iron Pipe.**—Yonkers, N. Y., opened bids on Monday, April 27, on 1600 tons. Prices submitted were very low, indicating that competition continues keen. The lowest bid was at a delivered price about representing cost at some of the best conducted Eastern foundries. Harrisburg, Pa., will open bids May 4 for 600 tons of 6, 8, 12 and 16 in. The private demand is irregular but the volume is larger than in the month of March. Quotations on carload lots of 6-in. continue at \$22 to \$23 per net ton, tidewater.

**Old Material.**—Local transactions have included small sales of cast scrap and a moderate movement in wrought pipe. Steel scrap appears to be in no demand from consumers, but dealers are purchasing conservatively to fill old contracts. Rejections by steel companies continue too numerous to be pleasant. The following quotations, per gross ton, New York, are made by dealers, but they are largely nominal:

Old girder and T rails for melting.....	\$8.25 to \$8.75
Heavy melting steel scrap.....	8.25 to 8.75
Relaying rails.....	21.50 to 22.00
Rolling rails.....	10.00 to 10.50
Iron car axles.....	18.00 to 18.50
Steel car axles.....	12.00 to 12.50
No. 1 railroad wrought.....	10.00 to 10.50
Wrought-iron track scrap.....	9.00 to 9.50
No. 1 yard wrought, long.....	8.50 to 9.00
No. 1 yard wrought, short.....	8.00 to 8.50
Light iron.....	3.25 to 3.50
Cast borings.....	5.75 to 6.25
Wrought turnings.....	5.50 to 6.00
Wrought pipe.....	8.25 to 8.75
Car wheels.....	10.00 to 10.50
No. 1 heavy cast, broken up.....	10.50 to 11.00
Stove plate.....	7.50 to 8.00
Locomotive grate bars.....	6.00 to 6.50
Malleable cast.....	7.25 to 7.75

Magnalium, an alloy of aluminum and magnesium, now successfully used for cylinders for gas engines, is being incorporated in the pistons of automobiles. Cast iron for pistons has a tensile strength of 18,000 to 20,000 lb. per sq. ft. with a specific gravity of 7.50, while magnalium is claimed to have 23,000 lb. tensile strength per sq. in., with a specific gravity of 2.5.

## British Business Still Small

### Pig Iron Is Lifeless and Semi-Finished Steel Is Easier, with a Poor Demand

(By Cable)

LONDON, ENGLAND, April 29, 1914.

The volume of business is very small. The markets are affected both by the Mexican and the Ulster questions. The Cleveland pig-iron trade is lifeless. Semi-finished steel is easier with a poor demand. Continental steel is weak. The January-March output of the Cleveland blast furnaces was 630,000 gross tons, being a decrease of 79,000 tons. The number of furnaces in blast is 168, against 210 at the same time last year. Last week's receipts of tin plates were 134,000 boxes; shipments were 99,000 boxes, and stocks are 332,000 boxes. A cargo of Tofo ore is nearly due at Glasgow and others are following. Stocks of pig iron in Connal's stores are 102,592 gross tons, against 109,731 tons a week ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. (\$3.07), against 12s. 9d. (\$3.10) a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 50s. 11½d. (\$12.39), against 50s. 6½d. (\$12.29) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 3d. (\$12.47), against 50s. 9d. (\$12.34) a week ago.

Hematite pig iron, f.o.b. Tees, 61s. 6d. (\$14.96).

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 12s. 6d. (\$27.37).

Steel ship plates, Scotch, delivered local yards, £5 17s. 6d. (\$28.59).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel rails, export, f.o.b. works port, £5 12s. 6d. (\$27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 75s. (\$18.25).

German 2-in. billets, f.o.b. Antwerp, 73s. (\$17.75).

German basic steel bars, f.o.b. Antwerp, £4 4s. to £4 5s. (\$20.43 to \$20.68), against £4 5s. to £4 6s. (\$20.68 to \$20.92) a week ago.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. (\$2.19 to \$2.43). Iron and steel sheets, 11s. to 12s. 6d. (\$2.68 to \$3.04). Beams up to 30 ft., 12s. 6d. (\$3.04).

(By Mail)

### Continental Finished and Semi-Finished Steel Lower—Hungry Rail Mills

LONDON, April 17, 1914.

The pig iron position has been considerably affected by the stoppage of the colliers in the South Yorkshire district, and prices of warrants have been raised by this influence, but the top prices were soon lost when it appeared clear that the trouble was nearing its end. There is no doubt that but for the restriction of output which is going on in the Cleveland district prices would be shillings lower than they are today, and it remains to be seen how they are to be kept up when once things in the fuel line become normal. So long as coal is kept up and coke is consequently unduly inflated in price, blast furnace owners will not put furnaces into operation. There is general complaint made of the dearth of new buying of pig iron, and certainly the export centers are very quiet and have been for a long time. Stocks of warrants in the public stores, however, remain at a really perilously low level. At the same time, with the wretched trade reports coming from all parts of Europe and America,



there is not the least inclination to bull the market. Hematite has not participated to any extent in the firmer feeling affecting foundry iron, and the steel makers of the Sheffield district who buy very largely of Middlesbrough hematite, have been forced in some cases to postpone deliveries because of their inability to secure supplies of fuel. The position is now, however, better in this direction and prices may rally a trifle when the strike ends.

In the market for semi-finished steel the tone is very poor, and it is really a question as to the price which needy works would accept for decent lines. Buyers are nibbling, but at prices which make the hair of producers stand on end. One consumer is out for a five figure lot of sheet bars, but his ideas as to price are somewhere around 74s. f.o.b., a figure which so far has not tempted any one. The French and Belgians would, however, accept about 76s., f.o.b., and some of them would be glad to get hold of the business. On the whole there is practical stagnation in the market as regards semi-finished steel. Fortunately the Americans have not come into our markets to sell billets and sheet bars, else no one knows what might not have happened to prices, low as they already are.

The tendency of finished steel is quiet but without the weakness, so far as British material is concerned, which is to be seen in foreign stuff. The falling of prices on the Continent is most persistent and there seems no stemming the tide of depression which necessarily has a reflex influence on what British makers are forced to accept. Barely anything is doing by the railroad companies in the matter of supplies of permanent way material, and the rail mills are anything but well provided with orders, while for the business which comes forward there is a hungry crowd of makers in the international rail pool countries, all eager to have their mouths filled. It now appears that the Dominion Iron & Steel Company in Nova Scotia took a much larger slice of the South African order than was reported at the time and that the company has now relinquished part of it, owing to inability to give delivery as required.

Ship plates are weak, but the disruption of the Scotch Association has not yet brought about the collapse of the North East Coast Association in England.

## German Structural Trade Improves

BERLIN, April 16, 1914.—It appears that the improvement in the structural steel trade, previously mentioned in this correspondence, has been more considerable than reports had indicated. The March shipment statistics of the Steel Works Union show that the movement of such products reached 201,033 metric tons, being the largest for any one month since July, 1912. It was 67,000 tons more than for February and 23,000 tons more than for March, 1913. The shipments of semi-finished steel were also somewhat greater than previously, but steel rails dropped to a lower level than had been touched since December, 1912.

The general iron trade has been quiet and the reviews still have a pessimistic tone, while the remarks made at company meetings are of the like tenor.

Market reports from Belgium are of a very discouraging character.

## Metal Market

NEW YORK, April 29, 1914.

### The Week's Prices

Cents Per Pound for Early Delivery						
Copper, New York			Lead		Spelter	
April	Lake	Electro-	New York	St. Louis	New York	St. Louis
22.....	14.75	14.25	35.50	3.80	5.10	4.95
23.....	14.75	14.25	35.05	3.80	5.10	4.95
24.....	14.75	14.25	34.30	3.80	5.10	4.95
25.....	14.62½	14.25	34.40	3.80	5.05	4.90
26.....	14.50	14.12½	34.75	3.90	5.05	4.90
27.....	14.50	14.12½	34.60	3.90	5.00	4.85
28.....	14.50	14.12½	34.60	3.90	5.00	4.85

Copper is lower and there has been at least fair buying at the reduced prices. The decline in tin has continued and some cheap lots have been bought. Lead is 10 points higher and quiet. Spelter is lower and dull. Antimony shows no change.

### New York

**Copper.**—For several days prior to Monday, outsiders or those other than the producers and their agencies had been making the market and in the face of light demand prices of resale lots steadily declined. On Monday the large sellers determined to take a hand and with a rush brought their price for electrolytic from 14.75c., 30 days, delivered, to 14.25c., 30 days, delivered, or 14.12½c., cash, New York, where it stands to-day. The reduction brought about business, some reports saying that as much as 20,000,000 lb. was taken between American and foreign buyers, although there is conflicting opinion as to the amount really sold. There is no evidence, so far as can be learned, that the buying has been sustained. Yesterday, on the strength of the better demand, an effort was made to send the price up again ¼c., but without success. It is pointed out that the business of the mills which consume copper hardly justifies any advance at this time. Few of them are operating on full time and they have few orders ahead. Lake copper is about 14.50c., cash, with high grade brands up to 14.87½s. The price in London to-day is £64 5s. for spot and £64 7s. 6d. for futures. Exports this month total 38,901 tons.

**Tin.**—Since the last report there has been some activity, especially on Thursday and Friday, when there was a good turn-over for future delivery. There was little doing on Saturday and nothing on Monday, but consumers took hold again yesterday. While no extremely large amounts were purchased in the week the total shows up respectably. Prices have declined steadily, the quotation to-day being 34.60c., and to the low level is ascribed the buying which has taken place. Consumers show no tendency to plunge despite the low quotations, their attitude being that they will buy a little now and more later. Deliveries this month are estimated as between 4300 and 4500 tons, which is excellent, but it does not entirely represent, of course, buying of this month inasmuch as many of the deliveries are against old contracts. Arrivals in April total 4741 tons and there is afloat 1090 tons. The quotations in London to-day are £158 5s. for spot and £160 for futures.

**Lead.**—The American Smelting & Refining Company on Monday advanced its price \$2 a ton, or to 3.90c. per lb. The advance has given the market a better tone, but not so much as would be the case under more normal conditions. Consumers are well supplied, having bought heavily at the lower prices of recent weeks and the market at present is quiet. The St. Louis price is 3.80c., having advanced 10 points on Monday.

**Spelter.**—Quotations are lower, those of to-day ranging around 5c., New York, and 4.85c., St. Louis. The market is quiet and a further weakening influence is the accumulation of stock in producers' hands.

**Antimony.**—Quotations are unchanged at 6.75c. to 6.95c. for Hallett's, 7.20c. to 7.25c. for Cookson's and 5.75c. to 6.25c. for other grades.

**Old Metals.**—Business continues dull. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	13.75 to 14.00
Copper, heavy and wire.....	13.25 to 13.50
Copper, light and bottoms.....	12.50 to 12.75
Brass, heavy.....	9.00 to 9.25
Brass, light.....	7.75 to 8.00
Heavy machine composition.....	12.25 to 12.50
Clean brass turnings.....	8.75 to 9.00
Composition turnings.....	11.25 to 11.50
Lead, heavy.....	3.65
Lead, tea.....	3.40
Zinc scrap.....	4.25

### Chicago

APRIL 27.—Quotations to which currency has been given suggest a weaker situation in the copper market than has been developed by actual buying inquiries. Purchasers have found the market little changed from the status of a week ago. During the week tin experienced a pronounced slump. Lead held with more firmness. The spelter market is decidedly weak. We quote as follows: Casting copper, 14.50c. to 14.75c.; Lake copper, 15c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 35.50c.; small lots, 37.50c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.05c. to 5.10c.; Cookson's antimony, 9.50c. for

cask lots; other grades, 8c.; sheet zinc, \$7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 11c.; copper clips, 11.25c.; red brass, 11.25c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 3.50c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 29c.

### St. Louis

APRIL 27.—Further weakness has developed in the Missouri metals. The close of the week found lead around 3.65c., with holders asking 3.70c. In spelter the price got below 5c., being quoted at 4.95c. and dull at that, with some holders asking 5c. Other metals are quoted as follows: Lake copper, 15.35c.; electrolytic, 14.60c. to 14.85c.; tin, 35c. to 35.20c.; Cookson's antimony, 7.60c. In the Joplin ore market the basis range for 60 per cent. was \$36 to \$40 per ton, with top settlements about \$43. Purchases were not heavy and restriction of production is spreading through the camp. Calamine was stronger, with the range for 40 per cent. \$18 to \$20, and the best settlements about \$25 to \$26. Lead ore was weak, although the quotation was held at \$45. We quote miscellaneous scrap metals as follows: Zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.; pewter, 26c.; tin foil, 31c.; light brass, 6.50c.; heavy yellow brass, 8c.; heavy red brass and light copper, 10c.; heavy copper and copper wire, 11c.

## Iron and Industrial Stocks

NEW YORK, April 29, 1914.

Depressing influences continued to dominate the stock market most of the past week. An improvement occurred on Monday, when announcement was made that Argentina, Brazil and Chile had proposed mediation between the United States and Mexico. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	9 1/2 - 10%	Pressed St'l, com.	39% - 42
Allis-Chal., pref.	41 1/4 - 41 1/2	R'y Spring, com.	25 - 26 1/2
Am. Can. com.	23 3/8 - 26 1/2	Republic, com.	20 1/4 - 22 1/4
Am. Can. pref.	87 1/4 - 89	Republic, pref.	82 3/4 - 85 1/4
Am. Car & Fdy., com.	45 - 49	Rumely Co., com.	6 1/4 - 8 1/4
Am. Car & Fdy., pref.	117	Rumely Co., pref.	20 3/4 - 21 1/4
Am. Loco., com.	28 - 30 3/4	Sloss, com.	25 1/4 - 26 1/2
Am. Loco., pref.	96 1/2 - 97 1/2	Pipe, com.	11 1/4
Am. Steel Foundries, com.	30	U. S. Steel, com.	56 - 58 1/2
Bald. Loco., com.	44 1/2 - 46	U. S. Steel, pref.	107 1/4 - 108 3/4
Bald. Loco., pref.	107 1/4 - 108 1/2	West'gh'se Elec.,	71 - 73 1/4
Beth. Steel, com.	37 1/2 - 40 1/2	Am. Ship, pref.	80
Beth. Steel, pref.	82 3/4 - 84 1/4	Chic. Pne. Tool	49 - 52
Case (J. I.), com.	80 1/2 - 83	Cambria Steel	46 - 47 1/4
Colorado Fuel, com.	24 - 29	Lake Sup. Corp.	18 1/2 - 18 3/4
Deere & Co., pref.	92 1/2	Pa. Steel, pref.	52 - 55
General Electric	141 - 144	Warwick	11
Int. Harv. Corp.	100 3/4 - 103	Cruc. Steel, com.	14 - 14 3/4
Int. Harv. Corp. pref.	99 - 100 3/4	Cruc. Steel, pref.	87 3/4 - 90 1/4
Nat. En. & St., com.	10 3/8 - 10 1/2	Harb. Wk. Ref., pref.	98 1/4
P'gh Steel, pref.	82 - 87	La Belle Iron, com.	35 1/4 - 35 5/8
		La Belle Iron, pref.	115 - 115 1/4

### Dividends Declared

The Warwick Iron & Steel Company, regular semi-annual, 4 per cent., payable May 15.

The Pressed Steel Car Company, regular quarterly, 1 1/4 per cent. on the preferred stock, payable May 20, and 3/4 of 1 per cent. on the common stock, payable June 10.

The International Harvester Company of New Jersey and the International Harvester Corporation each, regular quarterly, 1 1/4 per cent. on the preferred stock, payable June 3.

The Lackawanna Steel Company, regular quarterly 1 1/4 per cent. on the preferred stock, payable June 1.

The United States Steel Corporation, regular quarterly, 1 1/4 per cent. on the preferred stock, payable May 29, and 1 1/4 per cent. on the common stock, payable June 29.

The Pennsylvania Public Service Commission has refused the request of the railroads to be permitted to make changes in rate agreements with industrial railroads or individuals or industries on five days' notice. The effect of the order is that 30 days' notice will be required, as heretofore.

## OBITUARY

JOHN M. ARTERS, president Ajax Iron Works, Bradford, Pa., died at his home in Pittsburgh, April 11, aged 65 years. He was born in Pittsburgh, served in the Civil War, and at its close engaged in the sale of oil-well machinery in western Pennsylvania. For the past 26 years he had been identified with the Ajax Iron Works, having his headquarters in Pittsburgh. He leaves a widow, one daughter and one son.

WILLIAM B. BURKE, president William B. Burke Iron & Steel Company, Rochester, N. Y., died April 15, aged 73 years. He was born in Rochester and in 1864 engaged in the iron and steel business with his father, and at the latter's death in 1881 became head of the company. He was unmarried.

DAVID E. TITSWORTH, vice-president and general manager of the Potter Printing Press Company, Plainfield, N. J., died April 21, aged 64 years. He was the designer of a number of special machines used in the United States Government Printing Office and the Bureau of Engraving.

ROBERT J. FORMAN, proprietor of the Brooklyn Wire Works, Brooklyn, N. Y., and treasurer of the New York Wire Work Manufacturers' Association, died April 20, aged 62 years. He was born in New York City.

### Proposal to "Prove" Imataca Ore Deposit

At Montreal the committee of bondholders of the Canadian Venezuelan Ore Company has drafted a report recommending that \$100,000 more be expended in further proving the property at Imataca on the Orinoco River. Lack of thorough work in this respect is one of the reasons assigned for the unfavorable results of the first operations, which ran quickly into low grade ore. It is the opinion of the bondholders' committee that more complete testing must be resorted to if anything is to be realized on the investment. There is some unwillingness on the part of bondholders to put in more money, but there has been as yet no formal consideration of the committee's report.

"Gear Accidents and Their Prevention" is the title of the latest bulletin issued by the Industrial Commission of Wisconsin. It covers investigation since September 1, 1911, and shows that 208 gear accidents occurred. Unguarded gears caused 140 accidents; partly guarded gears, 22 accidents, and guarded gears 46 accidents. Those of the last named class were comparatively slight. The bulletin refutes the frequent assertion of employers that there is no necessity of guarding gears located 7 ft. or more above the floor. Paul J. Watrous, Madison, Wis., is secretary of the commission.

A patent (1,088,818—March 3, 1914) has been granted to John E. Greenawalt of Denver, Col., for a new sintering apparatus. In a pan turning on hollow trunnions is a grate on which the ore is placed. Ignition apparatus, consisting of a tank of oil and special burners, is stationed over the pan. The roof of the ignition hood is perforated, permitting of a down draft through the ore and out by way of the trunnions. Unusual uniformity in ignition is claimed. The original general patent covering the Greenawalt process was granted March 24, 1913. The one just granted is the first of a series covering details.

The general offices of the United States Light & Heating Company, now at 30 Church street, New York City, will be moved May 20 to the company's plant at Niagara Falls, N. Y. This transfer will result in bringing together the administrative, sales, engineering and production departments.

## IRON CONTENT OF LAKE ORES

## Further Decline in the Average Percentage in 1913 Shipments

W. L. Tinker, secretary of the Lake Superior Iron Ore Association, Rockefeller Building, Cleveland, has made a compilation showing the average iron and phosphorus content of the iron ores shipped from the various ranges in 1913, and a comparison with similar statistics for preceding years, as far back as 1902. The percentage of Bessemer ore shipments on the various ranges for each year are also given. Below are presented Mr. Tinker's figures for total shipments, for average iron content (natural) and percentage of Bessemer ore for the years 1913, 1912 and 1902. It will be seen that there was a small decrease in average iron content last year, though 1912 showed an increase upon 1911, after a practically continuous decrease since 1902. The net average decrease in 1913 for all ranges, which was 0.33 per cent., is not as large as might be expected from the large tonnage shipped and taking into consideration the fact that the percentage of lean ores is much greater when the mines are shipping well up to the maximum than when production is somewhat curtailed. The tables below take no account of the low grade, silicious and manganiferous ores, only Bessemer and non-Bessemer grades being considered:

BESSEMER ORES			
Gogebic Range			
Year	Tons	Av. iron, natural	Per cent. Bess.
1913	2,866,116	54.2071	68.0
1912	3,026,430	54.2386	64.1
1902	2,796,545	55.7324	87.5
Marquette Range			
1913	503,948	53.3717	14.3
1912	540,826	54.9180	15.0
1902	1,054,757	58.2631	29.9
Menominee Range			
1913	107,837	55.3393	3.0
1912	85,389	55.2117	2.5
1902	86,018	57.7141	2.8
Vermillion Range			
1913	1,200,674	58.8072	77.6
1912	1,369,602	59.3095	74.9
1902	1,639,108	61.5522	80.1
Total Old Range			
1913	4,678,575	55.3237	36.2
1912	5,022,247	55.7112	37.2
1902	5,576,428	57.9523	47.4
Mesaba Range			
1913	13,877,060	53.2644	41.5
1912	13,996,278	53.2513	45.3
1902	10,618,878	56.6690	80.6
Total Bessemer Ores			
1913	18,555,635	53.7836	40.0
1912	19,018,525	53.9009	41.9
1902	16,195,306	57.1109	64.9
NON-BESSEMER ORES			
Gogebic Range			
Year	Tons	Av. iron, natural	
1913	1,345,784	53.0517	
1912	1,691,851	53.2912	
1902	397,726	53.7872	
Marquette Range			
1913	3,024,893	52.7030	
1912	3,058,000	52.7308	
1902	2,464,187	55.1032	
Menominee Range			
1913	3,527,423	50.8530	
1912	3,252,805	51.0527	
1902	2,919,762	54.1020	
Vermillion Range			
1913	347,158	58.6264	
1912	457,332	58.7775	
1902	406,784	61.9984	
Total Old Range			
1913	8,245,258	52.2179	
1912	8,469,988	52.5245	
1902	6,188,459	54.9995	
Mesaba Range			
1913	19,584,395	49.3445	
1912	16,886,587	49.4922	
1902	2,546,936	53.5531	
Total Non-Bessemer Ores			
1913	27,829,653	50.1958	
1912	25,346,575	50.5043	
1902	8,735,395	54.5778	

## TOTAL OF BESSEMER AND NON-BESSEMER ORES

Old Range		
Year	Tons	Av. iron, natural
1913	12,923,833	53.3422
1912	13,482,235	53.7116
1902	11,764,887	56.3991
Mesaba Range		
1913	33,461,455	50.9701
1912	30,882,865	51.1958
1902	13,165,814	56.0663
Total Bessemer and Non-Bessemer, All Ranges		
1913	46,385,288	51.6311
1912	44,365,100	51.9603
1902	24,930,701	56.2233

A feature of the table is the great decline in the percentage of Bessemer ore shipped last year as compared with 1902. This is particularly noticeable on the Mesaba range.

## Turbines vs. Gas Engines for Steel Plants

Speaking before the Chicago section of the American Institute of Electrical Engineers on "Power Problems in Steel Mills," Monday evening, April 27, F. G. Gasche, Illinois Steel Company, made pointed reference to the shortcomings of the gas engine as an exclusive prime mover for steel-mill service. Mr. Gasche's references were directed particularly to the four-cycle twin tandem type of large capacity, driving alternating-current generators. The unsuitability of this type of prime mover for exclusive use, granting that under steady load conditions the gas engine has enough advantages to warrant its supplying a part of the power required, was based in part upon the following facts:

Investigation has not yet given sufficient data for determining accurately the extent of the loads thrown suddenly upon the prime movers in steel mills, particularly motor driven mills. Supplying sufficient spare capacity in gas engine units to carry these peak loads is accordingly a matter of guesswork and especially so because the regulation of the gas engine of the type under discussion is hopelessly inadequate to the instantaneous character of the mill load variations. The weight that is required to be put into flywheel and rotor parts to equalize the load is entirely out of proportion to the effective capacity of the units and the drag resulting from the inertia of these moving parts makes the question of adequate regulation impossible of satisfactory solution. The variation in torque inherent in the gas engine of this type as a prime mover, even under ideal conditions of constant load, is another essential handicap to its harmonious adaptation. The use of the storage battery for the absorption of the peak loads, while conceded to be an essential auxiliary to the gas engine plant as installed at some of the steel plants, does not provide a sufficiently flexible nor economical regulator of the load to offer a solution of the difficulties.

In contrast to the gas engine, the steam turbine was offered as an alternate, the regulation of which is much more closely adaptable to the conditions of steel mill service, both as to economy of operation under normal average load and under peak loads.

Mr. Gasche ventured the suggestion that a design of prime movers for a steel mill might provide 70 per cent. of the capacity in gas engines and 30 per cent. in steam turbines, in which proportion the probability of the power plant's adapting itself to the load conditions would be improved in every respect. Against the future development promised in the field of the gas engine, the possibilities to be realized in the use of superheated steam, in the range of temperatures above 700 deg. F., were regarded as even more attractive.

The Simon process for making ferromanganese in an electric furnace is reported to consist in dissolving manganese ore in a flux of fluospar and reducing it to metal in the presence of carbon. Since the temperature can be easily controlled and as the loss of manganese is claimed to be consequently small, the process has an advantage where current is cheap. The product is said to be lower in phosphorus and silicon than that produced by the blast furnace.



## FATIGUE IN INTENSIVE WORK

## How It Was Reduced in One Case—Improving Boiler Room Operation

At a session of the Efficiency Society held January 27, to discuss methods of introducing scientific management in the foundry, Arthur Brewer, superintendent Bridgeport Brass Company, Bridgeport, Conn., mentioned the following instance of the value of considering the fatigue factor in intensive work:

We had constructed a large Hurley cumulator. A part of this cumulator was some 40 or 50 ft. up above the railroad track. We first figured on putting up an elevator; and then we decided that it would be best to put up an incline. We began a long incline from the foot to the top of the cumulator. I haven't the precise figures for the grade. We made a premium rate based on the information we had as to the length of time it took the men to wheel a barrow from the bottom to the top; the length of time it took to roll on the level, going up a certain incline, and the time it took them to turn around and come back. We arranged a premium rate that we deemed was correct, and the men were put to work. I may say that all our men are now accustomed to the premium rates.

They started on this particular work and by noon they were exhausted. In short, they had not made good, and it was very evident that their rate was bad. A man, who was well versed in these matters, investigated, and in 5 min. he discovered the difficulty. The men were working too hard.

Finally we arranged with the foreman on the cumulator to blow a whistle at certain intervals, and we set a clock where he could see it, and at intervals—I believe it was 12 min.—he blew the whistle, and the men on the work would stop where they were, sit down on the wheelbarrow and rest 2 or 3 min. When the foreman blew the whistle again they would resume their work for another 12-min. period. The first hour's work showed a remarkable change, and the second day they made a very good premium allowance, and the third day they made some 40 per cent. premium.

We found that if a man is allowed to go ahead at his own pace he does not realize how much rest he requires. He is anxious to get the premium, and he works so hard that by night he is exhausted.

We have two boiler plants of 1000 hp. each, and one tubular boiler of some 600 or 700 hp., and three water-tube boilers. I was very anxious to improve our service, and my first difficulty was to get the correct information as to heating capacity. Our meters showed that our heaters failed sometimes 10 to 20 per cent. Our first move was to put in a good boiler meter. We finally got in a position where we were able to make a comparison, and we estimated that we had effected a saving of some 3½ per cent. That was merely an estimate because our previous records were incorrect.

Along in March or April of last year we started the scheme in the boiler house of giving cigars to the men when they attained a certain fixed standard of economy, and they were given three cigars a week if they attained a certain standard, and six cigars a week if they attained a higher efficiency. We gave away 12 or 13 boxes of cigars in the year, and made a saving of about 7¼ per cent. in coal, which represented \$3000 in money. We simply posted up the results on the blackboard so that the men would know daily how they were coming out, and it got so that they very rarely missed their cigars and were piqued if they did not get them.

## W. H. DONNER AS CHAIRMAN

## Impending Change in Penna. Steel Company

The probability of changes in the Pennsylvania Steel Company was referred to in these columns a week ago. It can now be stated that W. H. Donner, president of the Cambria Steel Company, will become chairman of the board of directors of the Pennsylvania Steel Company, and he will probably be elected at a meeting of the directors to be held in Philadelphia this week. It is understood that Mr. Donner was strongly solicited to assume this position by Pennsylvania Railroad and Philadelphia & Reading Railroad interests, the two railroads together owning most of the stock of the Pennsylvania Steel Company, while the former alone has more than a controlling interest. It is expected that no important changes of officers of any of the interested companies—namely, the Cambria, Pennsylvania and Maryland Steel—will be made for the present at least. Later there will probably be a consolidation of the Cambria Steel Company and the Pennsylvania Steel Company, which also owns the Maryland Steel Company. This is not assured, but has been talked over only in a tentative way. The Pennsylvania Steel and Maryland Steel companies are large buyers of plates, shapes and bars, and naturally under the proposed conditions most, if not all, of these needs would be supplied by the Cambria Steel Company.

## Steel Corporation Exhibit at San Francisco

Further announcement is made concerning the exhibit of the United States Steel Corporation and its subsidiary companies at the Panama-Pacific Exposition in San Francisco next year. This will begin with the ore fields and carry on an educative picture of operations in ore mining, rail and water transportation, dock operations, coal, coke and pig iron production, steel manufacturing in its various lines, and will also present in a materially displayed way the processes of manufacturing of many of the subsidiary companies' products. The utilization of by-products will be shown, with a display of many of the uses in which the corporation's general products are employed, typifying the advancement in the development of this country's resources.

In addition to the material exhibits, the corporation intends to illustrate in a comprehensive way, by moving pictures, its operations in all departments. It is proposed to set forth the work which the United States Steel Corporation has done toward the social welfare of its employees and those depending upon them. There will be an exhibit of many forms of safety devices developed by the corporation officials and employees, and in the installation of which large sums have been and are being expended. In this social welfare department will be shown the methods employed in the aid and care of the injured, in providing for the welfare of employees while at work and in their home surroundings; also the voice that is given employees through their committees in bringing about these improved working conditions.

The Western Scrap Iron & Steel Association held its regular monthly meeting at the Hotel LaSalle, Chicago, on the evening of April 21. An increased number of brokers and dealers from the Middle West was in attendance. The proposed 5 per cent. advance in railroad rates was discussed, and a resolution in support of it was passed. A committee was appointed to communicate with the various local railroads and consumers with reference to standardizing the manner of quoting prices on scrap. While no very well defined reasons exist for quoting on a basis of gross or net tons, there are many reasons why uniformity is desirable. This committee will report at the next meeting.

## The Worcester Conventions

(Continued from page 1079)

Wheel catalogs show wheels having virtually the same shape and size, yet differing slightly but sufficiently in some way as to prevent their universal use. This is brought about by the machine makers so designing their machines as to require a special shape wheel. In most of these cases, the points of differences in design are non-essential, hence, not called for. A standardization of the grinding machines so as to use standard shape of wheels with standard size of spindle hole would greatly benefit all parties concerned, and permit of quicker wheel deliveries.

Consideration of this recommendation by your association is earnestly urged.

### Standard Rules for Proper Condition of Grinding Machines

The condition of a grinding machine materially affects the grade of a wheel required. Wheel manufacturers have seen gradual changes in wheel requirements for the same machine because of the gradual change in the condition of the machine. Wheel manufacturers supply a large variety of grade and combinations of abrasives in wheels for the same work, due to the differences in the machines and their mountings in different shops. The condition of the machine and its mounting, positiveness of drive and original rigidity, etc., are as positive factors in causing variety in wheel specifications as are the difference in the materials to be ground. If the National Machine Tool Builders Association could affect standardization of grinding machines, the wheel makers would be in a very much better position to supply the wheel required.

This committee thoroughly believes that a standardization of the requirement in shapes and holes of special wheels, and an adoption of a set of rules for maintenance and care of machines would do much towards clearing away many of the troubles found in the use and operation of grinding wheels.

The convention committees follow:

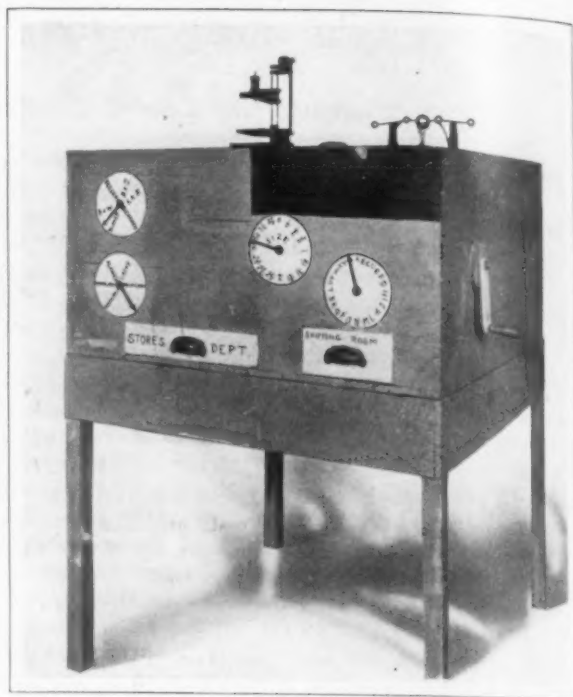
Auditing—J. G. Oliver, Bardons & Oliver, Cleveland; M. A. Coolidge, Fitchburg Machine Works, Fitchburg, and F. G. Harrison, the Massillon Foundry & Machine Company, Massillon, O.

Resolutions—Paul E. Thomas, the Kemp Smith Manufacturing Company, Milwaukee; George I. Alden, Norton Grinding Company, Worcester, and Charles E. Bilton, the Standard Manufacturing Company, Bridgeport.

### THE SOCIAL FUNCTIONS

A Good Fellowship dinner was given in the ball room of the Bancroft Thursday evening, by the local manufacturers in honor of the visitors. To use a slang phrase, it was "some time." There was no formal speaking, beyond a word of welcome from George I. Alden. The room was attractively decorated. The music of a band and of a splendid chorus of Swedish singers was interspersed with songs by soloists, and by the ox-dance given by a group of young Swedes. And finally came the minstrel show, at which many were "knocked." The Norton employees maintain this troupe of some 20 men year after year and their work equals that of many good professionals.

The stage in the beginning was set as the office of a small machine shop, and a discouraged owner was seen, complaining of his troubles. His visitors proved to be the end men, and when the drop goes up the interior of the shop is seen with a group of workmen. The manager goes out and the men "lay off" and rehearse a minstrel show, and do it well. Finally, an inventor appears, and demonstrates to Mr. Worcester the machine shown in the half tone. He sets the dials for a radial drilling machine. (He could have made any other type.)



The Watt machine of the Machine Tool Builders' Worcester convention, which builds any type or size of metal working machine while you wait—product and wireless order-taking auxiliary shown on top

The wireless is working, receiving orders. The dials are adjusted, the hopper is filled with scrap metal, old leather, etc., taken from "stores," the crank is turned, and presently a fully equipped radial drilling machine is produced, and is shot out on an aeroplane on its way to the customer. The programme tells a good deal of the plot:

### High Speed Steals

Not Too Brittle

Tempered to Suit the Ladies

#### SCENE ONE

OFFICE OF THE WORCESTER MACHINE TOOL CO.  
REUBEN WORCESTER, PROP.

Enter "Bat" Nelson of the "Stone Age."

James Watt, who invented steam.

Hans Schumacher, sole agent for everything from Ciel.

Emerson Taylor Brandeis—Sufficiency Said.

Wilson Jennings Bryan—just colored—not born that way.

(Scene One is simply an excuse to get rid of the "Old Man." If it is "dry," don't leave for any length of time.)

#### SCENE TWO

TYPICAL WORCESTER MACHINE TOOL CO. BEFORE HARRY WORCESTER SMITH LEARNED TO "PLANT."

"What's the Use in Workin'? The Old Man Aint In." The boys decide to rehearse a show—the "Old Man" pays by the hour.

#### SCENE THREE

"Cheese it, the Boss."

"Old Man" is unreasonably peeved and decides to give modern ideas a chance.

Orders taken by wireless.

Machines made from scrap iron, old shoes, etc.

"Six Dollars per day and a house and lot."

"Hurrah for the Old Man."

### WHISTLE

Patent rights reserved on all inventions disclosed at this meeting.

One of the pleasantest, and in a sense most unusual feature of the convention, was a luncheon Friday noon, given by the Norton Company. The members were taken to Greendale in automobiles and chartered electric cars, and were received with supreme hospitality. The Norton administration building—one of the finest in the country—has a great hall, and there luncheon was served, the guests sitting at small tables. President George I. Alden briefly welcomed the visitors; Louis C. Saunders, manager of the company's Niagara Falls plant, gave a talk, illustrated by lantern slides, describing the processes of manufacturing the com-

pany's basic materials; and John C. Spence, Charles L. Allen and Charles H. Norton each contributed to brief speech making in which humor was a predominant factor.

The local committees which had charge of the convention follow:

Finance, J. N. Heald, Heald Machine Company, chairman; George I. Alden, Norton Company; A. E. Newton, Reed-Prentice Company; A. W. Beaman, Stockbridge Machine Company; A. J. Gifford, Leland-Gifford Company.

Entertainment Committee: Carl F. Dietz, Norton Company, chairman; J. C. Spence, Norton

Grinding Company; John Nelson, *The Iron Age*.

Publicity: Harry W. Smith, Reed-Prentice Company, chairman; George N. Jeppson, Norton Company; Ernest T. Clary, Whitcomb-Blaisdell Machine Tool Company.

Reception: E. M. Woodward, Woodward & Powell Planer Company, chairman; Charles E. Hildreth, Whitcomb-Blaisdell Machine Tool Company; Charles L. Allen, Norton Company; Charles H. Norton, Norton Grinding Company; Harry W. Smith, Reed-Prentice Company; F. E. Reed; George Crompton, Reed-Prentice Company; G. P. Taylor, Robbins Machine Company.

## How May We and Our Men Earn More Money?\*

BY J. C. SPENCE

The record of the recent past, and the known evidences as to the immediate future point out the fact that if the American machine tool industry is to compete for the best class of workmen, there must be a change in our methods. Competition with Europe and with each other precludes the possibility of any great increase in the selling prices of our products.

The changes, then, must happen within our organizations; we must get more salable goods per dollar of investment, and this result must be attained, not by a decrease in the earnings of all concerned, but by an increase, else we will gradually lose the best of our men to such other industries as have, at present, a larger margin of profit. This movement has already made inroads into the field of good machinists, and every one of you is familiar with the statement that "we can't get the kind of man that we could some years ago." This lack of good men is, of course, not due entirely in our line, to the fact that other industries are offering better opportunities, but is more or less influenced by the fact that the growth of industry in general is faster than the supply of trained men would warrant. Nevertheless, it is a known fact that one industry in particular is taking from us many of our brightest young men, and is taking them almost entirely because of wages.

Granting, then, that conditions will remain practically as they are, the only method by which we will keep the personnel of our particular industry in the highest class is by the offering of greater wages. The mere act of holding a job has ceased to be the all-important inducement.

### INEFFICIENCY LARGELY FAULT OF THE EMPLOYER

Whenever the word efficient or inefficient has been used as applying to our line of work, the natural tendency has been for all minds to turn to the shop end of the business, especially to the man who runs a machine. Practically all of the illustrations by means of which our eminent experts have arrested the attention and gained a permanent lease of the ears of managers and boards of directors, have had to do with such perfectly awful incidents as a shaper tool taking a 5-in. stroke when a 3½-in. stroke would have been sufficient. I hold no brief for the man who cuts air when he should cut metal, but to my mind it is no more than right that we should first look to ourselves to see wherein we fall short of the mark of 100 per cent. If the workman is not efficient just what is our share of the cause of his inefficiency?

First, let me say, that it is my firm belief that the large majority (if I were to state a percentage I would say 90 per cent.) of all machinists employed by members of the National Machine Tool Builders' Association, are endeavoring to give you an honest day's work. That they do not give you more work than at present is largely your fault—so much your fault that it is going to take the whole of your attention to certain details before you can induce your men, and hence yourselves, to earn more money.

I am saying this from a mind that only a comparatively few years ago looked at the workman's side, only, of this question. I am not so far away from the operation of a machine that my memory has become dulled to what went on when I was trying to produce against obstructions allowed to stand in my way by my foreman and by his superiors. The metal cutters, or chip makers, on the simpler class of work, may be assumed to be fairly efficient in most of our shops. It has been a comparatively easy matter to set standard times or prices on these operations.

### MORE ENGLISH NEEDED ON SHOP DRAWINGS

There is still a good field for improvement in the making of drawings, especially for the workman's use. I'll venture to say that in every one of our shops to-day there are blueprints that the "old man" himself would not recognize as showing a part of his own inventions, if some one should cut the title corner off, and as for settling where the machining should begin, he would have to lose a good many minutes in study. Even the simpler drawings are a puzzle to the beginner and the foreman cannot be in all places at once. We should point out, on our drawings, by copious use of English and by means of routing sheets, just what the workman is expected to do.

I have not had the pleasure of visiting all of your shops, but the most of those that I have seen are open to this criticism. We are all drifting along, to some extent at least, in the old way of leaving a workman to his own initiative to find ways and means of doing a great share of the operations. The draftsman who learns to make drawings with the idea of saving time in the shop, gradually makes of himself an engineer in the true sense of the word, because in order to tell how a piece should be made, he first has to learn by consultation with those who do know. He is inducing himself to earn more money.

The foreman, who is fortunate enough to have his blueprints come to him in such form that the more intelligent of his men need little personal instruction and supervision, has more time to devote

\*A paper read before the National Machine Tool Builders' Association, Worcester, Mass., April 23. Mr. Spence is superintendent of the Norton Grinding Company, Worcester.



to the weaker members of his gang and his department output is higher—consequently, his own value increases.

#### PUTTING EMPLOYEE IN BUSINESS FOR HIMSELF

Right in line with this plan I recently tried an experiment that is interesting because it is illustrative of exactly what is going on in many shops and is causing the loss of a lot of money. A quantity of a certain small piece was sent to us by another firm to be ground. We had quoted on the work and there was a price we had to meet. As usual, in such cases, before letting the work start in the shop, we sent along with the pieces a routing sheet, which told how many pieces per hour we had estimated to be a fair production. The pieces were produced inside of the time limit and the net cost per piece was  $1\frac{1}{2}$  cents.

Several months later a lot of the same pieces came in and these were put into the shop and ground by the same man, but without anything to tell him what was expected of him. The second lot cost 2 cents each. Now the operator was not dishonest. I do not believe that he intentionally held back. He simply wasn't in business for himself. He would have produced those pieces for  $1\frac{1}{2}$  cents if there had been any means supplied for concentrating his mind on the job. Even if he had run into an obstacle that he couldn't overcome, he would have called for help, quickly, in order to protect his own record. As it was, the time drifted by without his having a very clear idea of anything in particular.

You've got to get the man interested, and there's only one way—put him into business for himself. How this is to be done, whether by premium or by piece work, matters little, provided you see to it that more product means more wages. There is just this much about it—those of you who stick to a straight day-work system, unless you devise ways of periodically rewarding increased efficiency, will lose your men to the shops that succeed in putting every man into business for himself.

#### RESULTS OF THE MODERN METHOD

I know of a shop that has reduced the cost of erecting its machines as shown by the following table, by doing two things: first, giving up the old, slipshod method of starting to erect before everything was ready, and second, by putting the assemblers into business by giving them a generous bonus for speed.

Machine	Old Cost Average	New Cost Average
No. 1 .....	\$43.73	\$22.62
No. 2 .....	45.01	19.78
No. 3 .....	45.21	18.26
No. 4 .....	36.78	18.25
No. 5 .....	41.26	18.84
No. 6 .....	32.35	18.97

The bulk of this reduction was due to the fact that all of the parts were ready before the erecting was started, but a lot of the saving came from putting the men into business. Where they were formerly paid \$3 per day, at day rates, they now earn about \$4.50 per day, and the rest of you would have a difficult task in trying to hire one of those men to go back to the old \$3 job, even if you guaranteed less exertion per 10 hrs.

An incident reported to me by the foreman of that job shows how it works out. He overheard one of the assemblers using rather forceful language to a truckman. It seems that the truckman had been sent to the stores to get a certain mechanism that was to be the next one to go onto the machine. He arrived at the stores at about six o'clock, and, as the mechanism was covered with an anti-rust compound, the stores boy, not wishing to

again wash his hands, put him off with some excuse. The truckman went back with an empty truck and the conversation overheard by the foreman was the result. I cannot, for obvious reasons, quote verbatim what he told the truckman, but the gist of it was to get back to the stores with word that the mechanism had to be at the machine, ready to be used at 7 o'clock the next day or something unpleasant would happen to both the truckman and the stores boy. That assembler was in business for himself.

Another incident: a lot of gears were being machined at the turret lathe. The operator could, ordinarily, make good pay at 10 cents each. The foundry had evidently made the gears of iron that was intended for larger work. They were hard. Under the old methods, it would be only by accident that this fact would be discovered before the job was completed. In this particular case the workman appealed to his foreman who took the matter up with the superintendent. The result was that the foundry acknowledged its error, paid for the amount the operator ran behind and the expense was put where it belonged. That man was in business for himself.

An operator noticed that some bars in a lot of tool steel machined much more rapidly than others. His insistence on having all the bars good ones led to a thorough investigation of the whole question, and the formulation of specifications on tool steel that now enable that firm to form 3-in. diameter tool steel bars with tools 3 in. wide at a surface speed of over 100 ft. per minute.

#### A RATE-SETTING DEPARTMENT ESSENTIAL

The firm, from whose experience these incidents have been cited, believes that the best way to put a man into business so that he can share profits on each job he does is to have a rate-setting department that is made up of good operators, under the leadership of a man who is, himself, capable of taking hold of any productive job in the works. It is almost always found to be a fact that a careful study of a job, not by the stop watch, but by actually doing it, leads to improvement. Sometimes there is only a slight gain. In other cases the time has been reduced to one-third of its former time.

The rates are set on the principle that since it has been found possible to reduce the cost and the concern was satisfied with that cost before this discovery, then the new rate can be placed well above what it actually can be done for. This is contrary to the old spirit of management, but is right in line with what most machine tool men at least believe, and is the only way you can get your men into business for themselves.

In this connection I do not wish to be understood when I mention the stop watch, as not agreeing that oftentimes facts can be learned and gains made through the medium of so-called efficiency workers, who are themselves perhaps incapable of performing the operations, but who are intelligent observers. What I do mean is that, personally, I believe the greater savings are to be made by having a skilled man study the job from an inventor's standpoint rather than from that of a recorder or historian. All interferences with production are not evident to a mere observer. Most of them hark back to the design or to conditions imposed by the relations of a given piece to others in the same machine.

#### THE NEW METHODS SHOULD PAY EARLY

The efficiency movement, like many other great movements, has its quacks who seize the time of

unrest to play upon the credulous ignorant. But every one of us should be thankful for the impetus given to our minds by the crusade definitely started by F. W. Taylor. The obtaining of the benefits of this common sense scheme need not cost anything. In fact it can be made to pay almost from the beginning. One good man can do enough for a group of men in so short a time that the extra production of the group will pay not only for the money spent on them, but also for further work with other groups. The scheme, properly conducted on a common sense basis, without frills, soon is compounding its gains. Such a movement, to be successful, requires the hearty backing of the management, for there will always be men in every organization, perfectly honest in their views, but who are unable to see beyond the tips of their own noses, when it comes to making a change from the established order of things.

A management that will accept, without considering it a personal affront, the statement that it is not as efficient as it could easily be made, and at the same time be so constituted mentally that it is eager to share with the producer in any saving that may be made, will easily find ways to reduce cost and need have no fear of either being unable to get good men or to hold them loyal.

#### TEACHING THE COST OF SPOILED WORK

Men are more often careless through ignorance than by nature or intent. The man who spoils a piece of work knows that he has destroyed value, but to him the time lost is usually the item that appears to be the most important. Men should be educated in the total value of the goods they handle. They should know the cost of materials and approximately the shop burden.

I know one superintendent who has adopted the system of having all spoiled work reported to him on a card that states the fault and the number of pieces spoiled. Whenever the case is of enough importance to attract his attention he makes it the excuse for a friendly talk with the man who did the job. He talks the affair over in a way that brings out both sides of the case. Before he lets go of that incident he has taught that man a whole lot about what it costs to carry the burden of a business. He has done more good than any "call down" would do, and he has strengthened the workman's loyalty to the firm, and this, without saying, includes a determination to spoil no more if he can help it.

Discharge should be the last resort, and a frequent use, under ordinary conditions, of the power of discharge, for any reason other than the lack of work is the sign of a poor shop management. Under the management that finds its main corrective in discharge the new man will be at a still further disadvantage because he will not have had the experience that caused the downfall of his predecessor.

#### MAKING THE FOREMAN AN EXECUTIVE

Now and then you will find a foreman who is a natural born business man, but this kind is rare, as foremen are usually promoted to their positions because they are good workmen, and not because of the other qualities that a foreman should have. There is a lot of difference between being a good workman and being a good executive. Most foremen have no definite idea of the cost of anything, except net labor, and it is not their fault either. Management rarely interests itself in a foreman to the extent of trying to make a real business man out of him. Yet the returns are well worth the effort.

Just start a scheme whereby each foreman really runs his own department and knows exactly where every cent is spent for which he is responsible, and you will find a most interested and watchful lot of men. You will find that having the entire list of officers on the alert for economy is away ahead of trying to do all of the worrying yourself about the time the cost department reports the facts, which is several weeks after the damage is done.

At the Norton Grinding Company we keep an account against each foreman and gang boss of all of the expenses for which he is directly responsible, that is, repairs and replacements, supplies, non-productive labor, spoiled work, etc. Such items as taxes, rent, power, etc., are, of course, not considered as he has no direct control over them. The total of his expenses divided by the total of his productive labor gives what we, for the sake of comparison, call the overhead of his department. At the end of the month he is given by the cost department all of his supply requisitions with the costs marked in, and all through the month, if another foreman does for him any non-productive job, such as repairing a machine or grinding a cutter, a duplicate of the time card is sent to him with the total money cost showing. This system has aroused more interest among the foremen than any scheme we have yet found.

#### INSTANCES OF INTEREST AMONG FOREMEN

One foreman found that he was being charged \$10 per week for trucking, the truckman, up to that time, being responsible to the head inspector, and responding to calls much the same as the bell boy plan in a hotel. The foreman kept careful record for a few weeks and then made the announcement to me that his trucking was worth only \$6 per week and that he didn't want to pay \$10 for it. The result was that we took one truckman away from the inspector and put him at productive work in the casting department, and the foreman hired a cheaper man to do simple productive work some of the time and trucking when it was needed.

Another foreman came to me with a milling cutter and said "We make cutter grinders for sale. How much time would you tell a customer that it would take to grind this?" I knew something was up, so I was conservative. My estimate was that it ought not to take over 2 hr. He thereupon produced a charge by another foreman of 16 hr. for the job. We both made a trip to see the other foreman with the result that the charge was reduced to 2 hr., which all agreed was ample. The foreman who had done the job was charged with 14 hr. of spoiled work, and the grinder operator was given his notice because his foreman said this was simply the climax of several such incidents, and he had failed to show any interest.

Even second-hand belting suddenly assumed great importance. I did not, at first, foresee that hairs would be split so fine, but it did not take long before a foreman wanted to know what became of a certain belt that was taken out of his department and replaced by a new one. I told him the good part of it would be spliced to another piece and used again. He wanted to know if I didn't think he ought to have credit. So now, when we take an old belt out, if the man in charge of belting says the bulk of it can be used again after cleaning and repairing, we credit the department with one-half the price of a new belt. When we use that belt again we charge the department getting it with one-half the price of a new belt.

Cotton waste is down to  $\frac{1}{4}$  lb. per week per



man using waste, and belting is down to \$18 per month, average, for the whole shop, where there are 1160 belts in almost constant use every working day.

The foremen are enthusiastic over the scheme. One foreman said, "Sure, I like it. It teaches me so much about my job that if you don't treat me right, I can go to some one else and tell him for just how much I can run a department, including my own wages." That is just the position we want him to be in, because we, being on the inside, know all about him and ought to be able to keep him, if we consider him worth keeping. If, by poor judgment, on our part, he leaves and is really worth more, then we can rejoice with him that he has benefited.

#### SHOP LOYALTY AND THE SUPERINTENDENT

The superintendent should never be too busy to take care of any matter that the foremen or workmen think is important, whether or not it is firm's business or personal, and he should be a man in whose word the men have confidence. His training and his actions should be such that the men will know that he is not asking for anything unreasonable, or that he would not do himself. He must be an enthusiast in his business. He must be a boy with the boys, in fact, he must never forget to be a boy at heart. All first-class enthusiasts are. He must always be on the lookout for good qualities in men. He must campaign for loyalty, a shop's best asset, just as the nation, through the public schools, campaigns for patriotism, for both are the result of plan and not of accident. Loyalty, like patriotism, is spontaneous only in times of intense emotion. It has to be created and fostered by well-laid plans that have for their fundamental principle, the giving of value for value received.

The superintendent must have the co-operation of the management in teaching the so-called non-producer that the business of capital is to make dividends, and that the only excuse for his particular non-productive existence is to help productive labor to make more chips or to get something assembled faster or better, and that the closing of his day's duties at a certain hour is merely an unimportant incident instead of being the great event that tradition has made it.

#### COMBATING UNIONISM

Before we leave this subject of loyalty it seems necessary to me that I should broach a subject that is usually tabooed in open meeting, but a subject that, to my mind, should be discussed openly, as it has to do directly with the earning power of all workmen who become infected. I refer to unionism as it is now conducted. What are we doing to combat or counteract it? Practically nothing that will have a permanent effect. The opposing of strikes by means of strike breakers and by any other combative means within our power is simply the expedient of necessity and is costly to both sides.

We must get at the question through the education of the individual. Practically nothing is being done in this line. The machinist who knows absolutely that there is nothing for him in unionism, as it is to-day conducted, learned it only by costly experience. It is going to take too long for all of your men to be educated by that method. The manufacturer has thus far stood between the union and the public, and has been discredited by the public because the public has been left practically ignorant of the employer's side of the question. The other side of the question sells more

newspapers, the people hear all about the one side and many untruths about the other.

Now, I know enough of the owners and managers of the firms in the National Machine Tool Builders' Association to state that there is not a fairer minded lot of men on earth in their dealings with the employed. If all of your workmen could know, to-day, the burden that shop owners have been carrying and are carrying in the problem of how to keep their men at work during this period of depressed business, there would be a great many men who would not stop to listen to the agitator when he starts in again. That your men do not know such facts as this is your misfortune, and it is my belief that you have every right to uncover such facts and especially to educate your men to such an understanding of business conditions that they will cease to listen seriously to many of the wild statements made on the street.

For instance, in Fitchburg, during the machinists' strike, the daily papers quoted a union leader as saying something like this: "You fellows average to get \$2.50 a day. You average to produce \$10 a day. The man in the automobile gets \$7.50 a day out of each of you." Now that statement was allowed to stand, and I believe that many of that man's hearers accepted it as being practically true. Those of you who can remember back, if you were so fortunate as to have the privilege of learning a trade, can also recall a time when that man would have arrested your attention, and if you had not followed him it would simply have been because you had other ideas about what you were after and not because his statement appeared to you to be so very far wrong.

The employer has not taken the trouble through well-planned intelligent means to teach the workman that net labor is not the great item in an industry. He thinks it is a serious sin to mention the word overhead outside of the office. He has not actually proved to anybody, but himself, that if a machinist gets \$2.50 per day and only produces \$10 of salable goods in the heavy lines of machinery, such as are made in Fitchburg, in a good many cases the "man in the automobile" would lose money. This kind of education should be spread broadcast. It is not a dream to think that it would be good for a high school boy to know something of the overhead of education and of business just as the engineering schools, notably the Worcester Polytechnic Institute, are teaching it.

Trained men should address workmen, in front of the shops, if you like, and the public at every possible opportunity, in an endeavor to clear the workman's mind of the ignorance that continually works against his own advancement. Employers already issue several very good papers for this purpose, but those papers are confined, in their circulation, almost entirely to men who already believe in that side of the question. These papers should be put into the hands of every man in your shops and would do a whole lot of good in the hands of men outside of your own calling. The printed matter should be followed up by intelligent, enthusiastic effort to convert men to the right way of thinking.

Even the Bible, as a book, would never have Christianized any country if it had not been for the enthusiasts behind it. Men must be taught that although they have rights, every right entails a duty to the community, and the service must be rendered before the right can be justly claimed. It's about time that the sane men of this country who hire labor, took hold of this question in an honest endeavor to get together with the sane men



of this country who have labor for sale, instead of leaving this important duty to labor leaders who would lose their jobs if they ever really did succeed in doing what they claim to be trying to do—that is, get us together.

### Discussion

PETER WEBER, Sloan & Chace Mfg. Company, Newark, N. J.—I think that the point that Mr. Spence made about giving more definite instructions to employees is well taken. Within the last two weeks I had a special job calling for beveled gears with about 30 teeth and another for 60. Happening to pass by the workman to whom this work had been given I found that the method he was using would have made the work cost more than I had agreed to sell it for, and it turned out that the workman had totally misunderstood his instructions as they had been given verbally instead of in writing, and it also transpired that neither the foreman nor the superintendent had the right understanding of what I had in mind as to the best way of turning out this job.

FRED A. GEIER, Cincinnati Milling Machine Company.—On the question of shop management, I happen in the past few days to have been told confidentially about an investigation that was made for one of the biggest concerns in the country as to what it cost them to try out men whom they eventually had to discharge. It cost them \$35 per man to hire a man and put him on long enough to try him out before discharging him for inefficiency. We have a very highly developed system of industrial activity, and there is constantly a greater and greater need for more efficient industrial workers.

For some reason or other the cost of living is high, therefore higher wages are almost a necessity and with it all there comes social legislation leading into all sorts of experiments. And unless we ourselves as manufacturers and employers take a real active part in an effort to solve the conditions that surround us, the experience of the past will not serve us because we in the present age are readjusting a good many things.

C. H. NORTON, Norton Grinding Company, Worcester, Mass.:—I think we ought to give serious consideration to the question as to whether our methods of drawing for shop blueprints does not need amendment in practical particulars. We have no assurance that present methods are right simply because they have always been so taught in the schools. I have a dim idea that all of the blueprints that go to our shop are lacking in the respect that they do not give the information they should definitely and understandingly give. A draftsman wants to indicate everything by some symbol which he has been taught is the proper thing to use.

WILLIAM LODGE, Lodge & Shipley Machine Tool Company:—The great difficulty is we teach a workman simply to do a certain thing and by repetition try to make him expert. He will succeed in doing it well and doing it quickly provided only that his foreman sees to it that he does it. It is, therefore, very important, I think, that we have men in charge of small groups who can and will watch each movement of each man and correct him when he is not right. Each individual man must be taught how best to handle each particular part and control his machine so as to get the best possible performance out of it. The man must be taught before you can get from him the kind and amount of service that you can reasonably expect and at the cost at which it must be done.

PRESIDENT VIAL:—During the reading of Mr. Spence's paper I have had my father in mind more

than at any other convention that I have ever attended. My father was always harping on the very same principle Mr. Spence brought out. I used to maintain that from his observation in the shops he was certain that instead of the workmen being called to account in many cases for failures, the men in charge were the ones that should have been called, for failing properly to instruct the men. He used to say that if proper instructions were given three-fourths of the mistakes would be avoided. I believe that you will all agree with me that what Mr. Geier has said about the cost of trying out men's efficiency, if it runs up to as much as \$35 a man, is well worth studying to remedy, as \$35 a man in a plant employing 500 men will soon run up into money.

### The General Electric Company's Year

The twenty-second annual report of the General Electric Company, covering the operations of the year ended December 31, 1913, states that the business of the company in that year exceeded in volume the record of any previous year. The value of orders received was \$111,819,142, and the amount of sales billed was \$106,477,438.76. In no previous year had the sales amounted to \$100,000,000. The profits from sales in 1913 was \$10,269,605.45 and the income from other sources was \$3,796,184.43, making the total net income \$14,065,789.88. In 1912 the company's total net income was \$13,110,823. After paying dividends of 8 per cent., \$4,908,674.64 was carried to surplus account, bringing the total surplus at the close of the year up to \$16,939,819.50.

The expenditures during the year for additions and improvements to manufacturing plants aggregated \$11,373,118.10 and the amount written off for depreciation was \$6,502,060.40. As heretofore, the expenditure for the purchase of patents, for applications and licenses under patents and for miscellaneous expenses in connection therewith, amounting to \$662,925.40 for the year, has been charged to income account, and the patent account is carried at \$1 in the balance sheet.

Chairman C. A. Coffin informs the shareholders that the \$8,000,000 issue of notes put out last July had been paid off on April 16, leaving the company without any floating debt. His report further says that more than 600,000 separate orders had been received during the year. The tendency toward a reduction in their average value has continued, and this, with increased competition, has added to the expense of securing and filling orders. The number of employees on the payroll when the year ended was in excess of 65,000.

Several foremen and others employed in case-hardening and heat treating departments of plants in and near Detroit have organized the Steel Treating Research Club which is to be addressed at monthly meetings by metallurgists and men who can impart scientific knowledge of case-carburizing and heat-treating of carbon and alloy steels, and various grades of tool steels, with a view of helping the members in solving the problems that confront them from time to time. The membership will be limited to foremen and assistant foremen of case-hardening and heat-treating departments, tool smiths and tool hardeners. H. J. Lawson, Cadillac Motor Car Company, is president; J. B. Ethier, United States Metal Products Company, vice-president, and D. W. Bauer secretary and treasurer.

Electric current from waste heat alone, to the extent of about 1,750,000 kw. per week, is being generated in the Cleveland district, England, according to J. H. Harrison in a paper, "Manufacture of Iron and Steel," read before the Cleveland Institution of Engineers at Middlesbrough on March 23, 1914. He stated that this power was being generated for sale at a lower cost than anywhere else in the United Kingdom.

### Papers for the New York Steel Meeting

A strong programme has been prepared for the meeting of the American Iron and Steel Institute, to be held at the Waldorf-Astoria, New York, on Friday May 22. The tentative order of papers as given out by Secretary James T. McCleary is as follows:

- Address of the President.....Elbert H. Gary  
 "Modern American Blast Furnace Practice," by Hermann A. Brassert, Illinois Steel Company, South Chicago, Ill.  
 Discussion by John N. Reese, Republic Iron & Steel Company, Youngstown, Ohio; Arthur J. Boynton, National Tube Company, Lorain, Ohio; Edward B. Cook, Pickands, Mather & Co., Cleveland, and Richard V. McKay, Pennsylvania Steel Company, Steelton, Pa.  
 "Some Developments in By-Product Coke Ovens," by William H. Blauvelt, Semet-Solvay Company, Syracuse, N. Y.  
 Discussion by Carl A. Meissner, United States Steel Corporation, New York City.  
 "Selling Policy as Influenced by Modern Cost Accounting," by Thomas J. Bray, Republic Iron & Steel Company, Youngstown, Ohio.  
 Discussion by Charles S. Robinson, Youngstown Sheet & Tube Company, Youngstown, Ohio, and H. D. Westfall, La Belle Iron Works, Steubenville, Ohio.  
 "The Practical Importance of Heat Treatments in the Steel Wire Industry," by John F. Tinsley, American Steel & Wire Company, Worcester, Mass.  
 Discussion by J. W. Smith, Wyman & Gordon Company, Worcester, Mass.  
 "Transportation," by J. Fred Townsend, National Tube Company, Pittsburgh.  
 Discussion by Delos W. Cooke, Erie Railroad Company, New York City, and Thomas O. Cole, Bethlehem Steel Company, South Bethlehem, Pa.  
 "Recent Progress in the Building of Large Steam Turbines," by Francis Hodgkinson, Westinghouse Machine Company, East Pittsburgh, Pa.  
 Discussion by H. G. Stott, Interborough Rapid Transit Company, New York City.  
 "Sanitation in Panama and Alabama," by Dr. Lloyd Noland, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.  
 Discussion by Dr. Sidney McCurdy, Youngstown Sheet & Tube Company, Youngstown, Ohio.

### Steel Manufacturers' Association

The Association of American Steel Manufacturers held its eighteenth annual meeting at the Hotel Schenley in Pittsburgh on Tuesday, April 21. The following officers were elected:

- President—P. E. Carhart, inspecting engineer Illinois Steel Company, Chicago.  
 Vice President—F. E. Abbott, inspecting engineer Lackawanna Steel Company, Buffalo.  
 Secretary-Treasurer—Frank A. Robbins, Jr., Pennsylvania Steel Company, Steelton, Pa.

The retiring president, A. A. Stevenson, of the Standard Steel Works Company, was presented with a silver centerpiece filled with flowers, in appreciation of his three years' service as vice president, 1908 to 1911, and three subsequent years as president, 1911 to 1914. Mr. Carhart, the new president, has been connected with the association almost from the beginning and has served as vice president during the past three years. The association now numbers 34 members.

### Iron and Steel Institute Members

The following were elected to membership in the American Iron and Steel Institute at the directors' meeting, held in New York on April 24: Active Membership—Joseph D. Fraser, general manager Atikokan Iron Company, Port Arthur, Ontario, and J. Frater Taylor, president Lake Superior Corporation, Sault Ste. Marie, Ontario. Associate Membership—Leon A. Beeghly, Toledo, Ohio; Joseph T. Ryerson, vice-president Joseph T. Ryerson & Son, 30 Church street, New York; Charles E. Willard, president Willard, Sons & Bell Company, South Chicago, Ill.

After May 1 Armand Alexandre, broker in iron and steel scrap, now at 1925 Peoples Gas Building, 122 Michigan avenue, Chicago, will be located in suite 1253 in the same building.

### March Automobile Shipments Make Record

March was a record month for the shipment of automobiles in this country, and April will exceed any similar month of past years, according to a statement by Alfred Reeves, who has returned to New York after visiting 41 automobile plants in Ohio, Michigan, Indiana and New York, in connection with his work as general manager of the National Automobile Chamber of Commerce, which includes 91 factories in its membership. The figures supplied by Mr. Reeves are taken from the records of the freight and traffic office maintained by the chamber at Detroit. They show that in March shipments in the Western district were more than 60,000 cars, for which 13,510 freight cars were required, which is the largest single month of which the industry has any record. There is a demand for 14,000 freight cars for April deliveries. If automobile freight cars alone were used there would have been a shortage, but the Ford Motor Company and a number of other manufacturers are able to utilize 36-ft. cars, which has avoided a shortage. He points out that in Detroit there are 114 factories producing automobiles or automobile parts, of which 35 are making pleasure cars or trucks complete.

### Smith-Booth Usher Company Improves Facilities

The Smith-Booth-Usher Company, Los Angeles, Cal., has completed reorganization plans which will better enable it to answer the demands which increasing trade are imposing upon its facilities. In various departments will be handled, as heretofore, irrigation machinery, steam boilers and power plant equipment, pipe, fittings, valves and mill supplies, transmission machinery, machine tools and wood working machinery. The Lambert Steel Hoof tractor for farm and road work will be taken over and handled directly by S. J. Smith, with offices and warehouse at the same address. The officers of the Smith-Booth-Usher Company are as follows: H. P. Usher, president and managing director; J. R. Hoffman, vice-president; F. P. Duncklee, treasurer; J. A. Nickell, secretary; L. M. Shockley, assistant secretary, and E. H. Breidenbach, general manager of sales.

A new form of apparatus for sintering finely divided ores and similar materials is embraced in a patent (1,089,153—March 3, 1914) granted to Albert F. Plock, Pittsburgh. A thin bed of material, spread on herringbone grates in specially designed cars, is ignited and sintered while passing over a receptacle from which the air is being exhausted. Each car has its own separate air chamber and the operation can be intermittent or continuous. The ore-carrying units can be transported any distance from the sintering machine. The process resembles that of Dwight and Lloyd.

Iron and steel manufacturers in the Ironton, Ohio, and Ashland, Ky., districts have organized the Ironton-Ashland Manufacturers' Association for the purpose of acting together on freight rate questions. T. M. Adams, president of the Norton Iron Works, Inc., Ashland, is president of the association, and R. D. Meacham, Union Furnace Company, Ironton, is secretary and treasurer. I. P. Blanton, heretofore of the Carolina, Clinchfield & Ohio Railroad, will be the association traffic manager.

The Seattle Car & Foundry Company, Seattle, Wash., operating a plant at Renton, has secured under sharp competition a contract for \$50,000 worth of logging equipment for the Red River Lumber Company, which is building one of the largest lumber mills in the world at Westwood, in northern California. The order includes 60 logging cars of special type, each having a dead weight capacity of 80,000 lbs. Delivery is to be completed within the year.

The office and factory of A. J. Cropp & Co., manufacturers of concrete mixers, will be located at their new plant, 1840-42 Carroll avenue, Chicago, after May 1.

## PERSONAL

Andrew Carnegie is a visitor in Pittsburgh this week. On Tuesday he was entertained in Homestead while on his way to inspect the public free library in Duquesne, which he gave to that town some years ago but had never seen. On Wednesday he attended a celebration at Braddock commemorating the twenty-fifth anniversary of the free library given by him to the town of Braddock, and mainly for the employees of the Edgar Thomson steel works. There was a dinner in the evening at which he, Charles M. Schwab and others made addresses. On Thursday Mr. Carnegie attended Founder's Day exercises at the Carnegie Institute of Technology, and made the principal address.

Charles R. Robinson, general manager of sales of the Lackawanna Steel Company, Buffalo, is in Europe.

H. J. Bradner, vice president of the Lees-Bradner Company, Cleveland, Ohio, sailed April 25 for a two months' business trip to Europe.

Sir Robert A. Hadfield, who has been in the country for some months, sailed for England on the Mauretania on Tuesday.

Howard C. Thomson, who for a number of years has been connected with the Philadelphia office of Rogers, Brown & Co., has resigned and accepted a position with Swayne & Mills, dealers in coal, pig iron and coke, Land Title Building, Philadelphia.

E. J. Deckman, for seven years past the representative of the Hoppes Mfg. Company, in Pittsburgh, has become district sales manager for the Eynon-Evans Mfg. Company, for Pittsburgh and vicinity, with an office in the Oliver Building.

Morris Bush, general manager of the Woodward Iron Company, Birmingham, Ala., is spending some time in California for the benefit of his health which has been impaired by several years of arduous duty. During his absence, which will be of some duration, his place will be filled by John J. Shannon.

Joseph Woodward, founder and president of the Woodward Iron Company, is in feeble health in Florida. It is feared that he cannot live long. Mr. Woodward went to the Birmingham district from Wheeling, W. Va., in the early eighties and established what has been the most successful iron manufacturing concern in the Southern States.

J. R. Cohn, secretary-treasurer of the National Iron & Steel Company, Houston, Tex., has resigned, effective May 1, having joined the selling force of Sonneborn Brothers, New York and Germany, lubricating oils, to cover western Texas.

Frank Gould, who recently resigned as sales manager of Henry Disston & Sons, Inc., Philadelphia, will become president May 1 of the Bishop Company, which is to be incorporated with a capital stock of \$500,000 and will take over the business of George H. Bishop & Co., saw manufacturers, Lawrenceburg, Ind. Charles R. Bishop is retiring, while Charles E. Bishop, Jr., will continue to take an active part in the business. Mr. Gould has been in the employment of the Disston house from the time he was 11 years old, starting in as an office boy. He has taken great interest in association work, and served on the executive committee of the American Hardware Manufacturers' Association.

Ambrose Swasey, president Warner & Swasey Company, Cleveland, Ohio, sailed to-day for Europe, where he will remain about six weeks.

L. R. Custer has been appointed superintendent of the armor plate department of the Homestead steel works of the Carnegie Steel Company, succeeding S. S. Wales. Mr. Custer was formerly assistant to Mr. Wales.

Albert A. Corey, brother of W. E. Corey, former president of the United States Steel Corporation, has been appointed general superintendent of the Homestead steel works to succeed Col. Azor R. Hunt, who will retire May 1.

## Manganese Flour as a Super Hardener

A new use for metallic manganese has recently been introduced by the Goldschmidt Thermit Company, 90 West street, New York. The metal in the form of a powder, known as manganese flour and containing 98.5 per cent. manganese and free from carbon, is now being extensively used for facing steel castings which in service require a soft steel center and a very hard surface. The majority of these castings are used in rolling mills, flour mills, cement mills and in situations where grinding and crushing machinery, dredging and ore lifting buckets are employed. The castings are principally wabblers, gears, pinions and bucket bottoms, all subject to severe service.

Manganese flour is mixed with linseed oil to the consistency of a wash and then applied to the mold to a depth of 1/16 to 1/8 in. Silica wash is applied as usual before the manganese. The mold is then baked and the steel poured, the manganese being absorbed on the surface. On cooling, the surface of the casting is said to be so hard that it cannot be machined. Several large steel companies are using this process on gears and pinions in particular. Reports are to the effect that such gears wear from 400 to 500 times longer than formerly. The process in principle is quite old, but ferromanganese was used in former attempts which is said to have caused the trouble, the 6 to 8 per cent. of contained carbon making the surface of the castings rough and blowy.

## Sixty Per Cent. Operation in Chicago District

The mills of the Chicago district are operating at about 60 per cent. of capacity. More new business than is now offering will have to materialize or even this rate will be difficult of maintenance. The situation at the South Works of the Illinois Steel Company is relieved by the flexibility of its mills, which in the absence of rail tonnage can be turned to sheet bars for the Gary plant of the American Sheet & Tin Plate Company and billets for the Bay View bar mills. The Washash Railroad recently placed 2500 tons of rails with the Illinois Steel Company.

The annual meeting of the Joseph Dixon Crucible Company was held at the company's office in Jersey City, N. J., April 20. There was a large attendance of stockholders, who expressed their satisfaction with the management and re-elected the board of directors as follows: George T. Smith, William Murray, George E. Long, E. L. Young, William G. Bumsted, J. H. Schermerhorn and Harry Dailey. The officers elected by the board of directors are: President, George T. Smith; vice-president, George E. Long; treasurer, J. H. Schermerhorn; secretary, Harry Dailey; assistant secretary and assistant treasurer, Albert Norris.

Manufacturers of the Naugatuck Valley, Connecticut, are making preparations to carry out a plan, which has been under contemplation for some years, to create a great reservoir to store the flood waters of the basin for use in dry seasons, to create power at dams lower down the stream, and especially to flush the river bed, that any nuisance that may exist will be eliminated. The engineers' plans call for a reservoir that will contain 15 billion gal., a capacity which has few equals in the East. The location is in Thomaston, where the dam will confine the waters of three important feeders of the Naugatuck River.

The bulletin of the American Railway Association shows that on April 15 the net surplus of idle cars on the lines of the United States and Canada was 212,869, against 139,512 on April 1, an increase of 73,357. Since January 1 there has been a net increase of about 24,000 in the idle car surplus. A general slowing up in the demands of shippers is indicated by the last statement. The surplus of box cars increased in every section of the country except Montana, Wyoming and Nebraska.



## Pittsburgh and Nearby Districts

The Pittsburgh & Lake Erie Railroad has bought the machine shops of Bollinger Brothers, Inc., at Newell Station, Pa., together with 8½ acres of ground. It is understood that the railroad will operate the shops. Announcement is made by R. W. Cooke, industrial agent of the Pennsylvania Lines West of Pittsburgh, that Bollinger Brothers, Inc., have purchased five acres of ground at Economy, Pa. At the new location two buildings of steel and brick construction, 120 x 240 ft. each, will be erected, also a foundry building with a 25-ton cupola. About 300 tons of structural steel will be required in the erection of this plant. Construction will be started at once and it is expected that the buildings will be ready for occupancy in less than six months. Coal tipples, coal washers and coal-handling machinery will be manufactured.

Mackintosh, Hemphill & Co., Pittsburgh, have received a contract from the United Steel Company, Canton, Ohio, for a large universal slabbing and plate mill to replace a present smaller mill which is to be torn out. The machinery builders named have received several other large contracts for steel-works equipment and are running their shops full time, with work ahead for some months.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, has made tentative plans for the building of several more finishing mills and may possibly take up the manufacture of one or two new lines of product. The building of these new mills, however, depends largely on business conditions. If there should be an improvement in the near future, work may commence late in the summer or early in the fall. No definite decision has been made as to the character of the contemplated extensions.

W. W. Shilling, president Sharon Foundry Company, Sharon, Pa., has secured an option on about 100 acres of land at Wheatland, Pa., and it is possible that a large manufacturing plant may be built on the property.

The Flinchbaugh Mfg. Co., which is to remove its gasoline engine factory from York to Greencastle, Pa., has begun construction work at the new location. The main manufacturing building will be 80 x 200 ft., and the foundry building will be 60 x 100 ft. Considerable new equipment will be needed for the foundry and the company will install a new gas producer plant.

The Morse Iron Works, Erie, Pa., is being reorganized and will be taken over by former stockholders but they will not operate the plant.

The citizens of New Castle, Pa., have decided to erect a water works.

The Riverside works of the National Tube Company at Benwood, W. Va., will close this week for an indefinite period on account of lack of demand for steel pipe, and about 2500 men will be thrown out of employment. The company will also blow out one blast furnace at McKeesport, Pa., and one at Lorain, Ohio.

The Allegheny Steel Company, Pittsburgh, has closed down No. 1 department at its plant at Brackenridge, Pa., containing eight sheet mills, owing to the poor demand for sheets.

The Riter-Conley Mfg. Company, Pittsburgh, has received an order from the Southern Car Company for 1500 flexible galvanized transmission towers and 500 strain galvanized transmission towers for shipment to Charlotte, N. C., requiring about 1500 tons of material; also a tankage order requiring about 500 tons of plates for shipment to M. G. M. Luykx, Port of Spain, Trinidad; also an order from the Illinois Steel Company, South Chicago, for the plate work for four hot-blast stoves and for the relining and piping for one of its blast furnaces, the job requiring about 600 tons of plates.

The Mesta Machine Company, Pittsburgh, has received an order for a 28-in. x 38-in. twin tandem horizontal double acting natural gas engine to be direct connected to a 1250-kw. a.c. generator to run at 120 r.p.m., from the Sistersville Electric Light & Power Company, Sistersville, W. Va. It is larger but of similar

design to the other two Mesta gas engines installed by the same company in 1911. The Whitaker-Glessner Company, Wheeling, W. Va., has ordered a Mesta 26-in. x 48-in. simple Corliss steam engine of the heavy duty rolling-mill type.

The hearing in the matter of reducing the 88c. ore rate from Lake Erie to Pittsburgh and Wheeling districts, scheduled to occur in Pittsburgh on Monday, April 27, before Examiner Myron A. Pattison, was called off. Representatives of both the steel interests and the railroads united in a motion to adjourn so that the hearing could be taken before the Interstate Commerce Commission at Washington.

In the past week the Carnegie Steel Company blew out No. 4 blast furnace at the Ohio works, Youngstown, No. 4 Duquesne stack and No. 6 Carrie stack. At present the company is operating 37 of its 59 blast furnaces.

The Greenville Metal Products Company, Greenville, Pa., has changed its name to the Greenville Steel Car Company.

The Youngstown Chamber of Commerce has appointed a publicity committee of which James A. Campbell, president Youngstown Sheet & Tube Company, is chairman.

The Allen S. Davison Company, recently incorporated, has opened an office at 2512 Oliver Building, Pittsburgh, to handle raw materials for the manufacture of iron and steel products. George S. Davison is president, Albert P. Meyer, secretary, and Allen S. Davison, treasurer.

At the annual meeting of stockholders of the American Spiral Spring & Mfg. Company held in Pittsburgh last week, directors were elected as follows: William McConway, Jr., John Pfeil, L. L. Wolfe, J. B. Thomas and Robert E. L. Bailey.

Nearly all the railroads centering in Pittsburgh have prepared tentative tariffs for spotting cars on private switches. The roads propose a rate of 5½c. a ton, with a minimum charge of \$2 a car.

The General Electric Company has recently sold electric apparatus as follows: Pennsylvania Steel Company, Steelton, Pa., at 450 kv-a. regulating set, 600 hp. induction motor and switchboard; Detroit Seamless Steel Tube Company, Detroit, Mich., two 300-hp. induction motors with control equipments and switchboard; Indiana Steel Company, Gary, Ind., 27 15-hp. induction motors; Worcester Pressed Steel Company, Worcester, Mass., three 300 kv-a. transformers and a 500-hp. induction motor with control equipment and switchboard; American Iron & Steel Mfg. Company, Lebanon, Pa., a 4000 kv-a. two-unit three-bearing motor-generator set, with combined exciter and blower set; John Wood Mfg. Company, Conshohocken, Pa., two 200-kw. rotary converters, four 110 kv-a. transformers and a switchboard; Jeanesville Iron Works Company, Hazelton, Pa., three 200-hp. induction motors, with compensator.

Duriron is an iron alloy containing 12 to 15 per cent. silicon, other ingredients being kept secret. It is considerably lighter than cast iron, having a specific gravity of 7 and weighing 0.252 lb. per cubic inch. It can be incorporated in chemical apparatus, since it greatly resists corrosion and is not attacked by acids and alkalis of any strength. Machines or parts thereof can be cast of it and finished by grinding, it being too hard to be machined. Its tensile strength is 12,000 lb. per square inch, with a compression strength of 70,000 lb., and a melting point of 2550 deg. F. It takes a polish like nickel and has a heat conductivity higher than cast iron.

While the conventions of the allied foundrymen's associations at Chicago this year will be held in the week beginning Monday, September 7, the exposition, which is under the auspices of the Foundry & Machine Exhibition Company, will be open, as heretofore, on the Friday before convention week, and the exposition period is therefore September 4 to 11 inclusive.

# The Machinery Markets

In practically every section of the country the trade appears to be marking time pending the anxiously looked-for revival of demand. In some cities the quiet is even more pronounced than it has been and nowhere are there indications of a sustained change for the better. Spring buying appears to have been halted by the various uncertainties which are confronting the country. In New York the last week or ten days has brought another slump. Conditions are not good in New England, but a cheerful note is heard from many dealers and manufacturers. The Cleveland market is more unsatisfactory, it being evident that consumers are holding up every order they can. Both export and domestic business is dull in Cincinnati and jobbing foundries are operating only about one-half of capacity. Conservative buying by automobile makers has impaired the spring season in Detroit so far as machine tools are concerned, though electrical equipment is in good demand. Detroit foundries are operating between 50 and 60 per cent., as a rule, with those making automobile parts doing a little better. In Chicago there has been an improvement in trade, and more workmen are being taken on. The machine tool market in Milwaukee is uneven, but small power units and electrical machinery is in good demand. In the central South the best call is for farm power equipment. St. Louis looks for a big movement when the tide changes, but at present there is little tendency to buy. The only active lines in Birmingham are cotton handling and agricultural machinery, and it is pointed out that the districts given over to farming show no effects of depression, as do industrial centers. Crop prospects are good in Texas, but much trade is held up pending the solution of the Mexican difficulty. The best activity in the Pacific Northwest is that in the lumbering districts.

## New York

NEW YORK, April 29, 1914.

Sellers whose lines are restricted to one or two types of machine tools admit freely that with them business is poor, some of them finding almost none. On the other hand, as the lines of sellers become more extensive better reports are to be obtained. Houses which carry a good variety of machinery say that while trade is far below normal, fair orders are obtained now and then from unexpected sources, such, for instance, as an order amounting to over \$7000 from the Loose-Wiles Biscuit Company in Long Island City, another from a firm of silk finishers amounting to over \$3000, and others of less importance. These would not excite much comment at other times, but just now it is from such sources that practically all of the present business is coming. Those who ordinarily are regular purchasers of machine tools are for the time being out of the market to a great extent.

The Southern Pacific Company is one of the few railroads which has issued inquiries of late. Its purchasing officers at 165 Broadway, New York, have in hand estimates for the following machines, it having been stipulated that bids should be in by to-day: One 42-in. car wheel boring machine, one 2¼ x 26-in. combination turret lathe, one 37-in. cap shears for tin shop, one planer attachment for planing links, one oil rivet heating forge, one locomotive valve setting machine, one pipe cutting machine, one 14-in. x 8-ft. engine lathe with taper attachment, one locomotive rotary valve seat planing machine and one flue cutting machine.

The question is raised frequently among machinery men as to how far the Mexican embargo will stimulate demand, and the general opinion is that better business will result. It is pointed out in this connection that Congress has already passed a war bill appropriating \$235,000 for improvements at the New Orleans navy yard, while it is undeniable that the Government will require large quantities of materials of various kinds which will help industry generally. One such requirement, which is in the form of an inquiry, involves over 500,000 lb. of sheet zinc for lining ammunition boxes.

The Aluminum Goods Mfg. Company, Springfield avenue and South Nineteenth street, Newark, N. J., has purchased the entire block bounded by Belmont and Ridgewood avenues and Peddie and Runyon streets, that city, measuring 270 x 575 ft. Plans have been prepared for the erection of a concrete and steel factory building, 60 x 260 ft., four stories and basement, with a one-story addition, 50 x 150 ft., which will be used as a foundry. Excavation will be begun in two or three weeks, and the company plans to occupy the new build-

ing not later than April 1, 1915, when the present plant on Springfield avenue will be abandoned. The new equipment to be installed includes power presses and the shafting and hangers necessary to drive them, annealing furnaces and a general line of foundry equipment and a large amount of steel shelving. The estimated cost of the new building is \$100,000. E. S. Fickes, Pittsburgh, Pa., is the architect.

Esenwein & Johnson, Ellicott Square Building, Buffalo, architects, are taking bids for erection of a printing plant, 135 x 160 x 370 ft., one story and basement, brick, steel and reinforced concrete construction, to be built at Seneca, Lord and Seymour streets, for the J. W. Clement Company, commercial printer, at an estimated cost of \$100,000. A large amount of printing and binding machinery will be installed.

Contract has been closed with the Monarch Engineering Company, Buffalo, for the erection of a concrete bin elevator of 1,048,000 bu. capacity, to be erected on the city ship canal and Pennsylvania Railroad, Buffalo, by the Connecting Terminal Railroad Company. J. C. Evans is the vice-president. It will be electrically operated in all departments and all modern devices for the rapid and economical handling of grain will be installed.

The Buffalo Copper & Brass Rolling Mill Company, Buffalo, manufacturers of special metals, has increased its capital stock from \$250,000 to \$500,000 and plans extensive improvements in plant and machinery equipment.

The Cataract Brass Stamping Corporation, Buffalo, N. Y., has been incorporated with a capital stock of \$50,000 by F. E. Wattles, W. A. Morgan, F. G. Davis and others. It has taken over the factory of the Grimm Mfg. Company and will specialize in the manufacture of brass stampings. Additional equipment is needed. F. E. Wattles is president.

The New York State Pneumatic Tool Company, Inc., Buffalo, has been incorporated with a capitalization of \$200,000 to manufacture pneumatic hammers and other tools and machinery. The directors are John G. Doster, William Bender and Henry Cutting. For the present the offices are in the Electric Building, Buffalo. The hammers and other products of the company will be made under contract for the time being.

The Northwest Aluminum & Brass Foundry Company, Rochester, N. Y., recently incorporated by J. R. Loysen, G. A. Hetzler and C. Tepper, formerly interested in the Sill Stove Works, of that city, is completing a foundry building 50 x 100 ft., for the manufacture of aluminum, brass and bronze castings.

The Common Council of Ventnor City, N. J., will receive bids until May 6 for centrifugal pumps, sewage disposal works, etc.

E. T. Williams, industrial agent for the city of Niagara Falls, N. Y., announces that the Santo Rubber Company, Oliver Building, Pittsburgh, is completing plans for the building of a plant at Niagara Falls. The first buildings to be erected will cost about \$60,000.

The Electric Dishwasher Company, Buffalo, capitalized at \$100,000, has been incorporated by Eugene and Richard Cary and George W. Hewitt, of Niagara Falls, N. Y., and arrangements have been made for a factory.

The municipal board, Lyons, N. Y., Clyde W. Knapp, chairman, has approved plans for the construction of a sewage disposal plant, etc. The estimated cost is \$125,000. Witmer & Brown, Buffalo, are the engineers.

The Philip Christmann & Sons Company, Buffalo, has filed incorporation papers to manufacture metal ceilings. It has a factory at Virginia and Orange streets. Philip W. L. and E. M. Christmann are the directors. The capital stock is \$20,000.

Johnson & Fuller, New York City, engineers, are preparing plans for a sewage disposal plant for the city of Middletown, N. Y., to cost \$100,000.

The board of contract and supply, Albany, of which Isidore Wachtman is secretary, is receiving bids until May 18 for the construction of a sewage disposal works. Frank R. Lanagan is city engineer.

The Carley Heater Company, Inc., Olean, N. Y., has been incorporated with a capital stock of \$75,000 to conduct a general machine shop and foundry business. It will build and equip a plant. F. L. Gleason, William Abrams, Jr., and C. W. Wallis, Olean, are the directors.

The Nial Brothers Construction Company, Troy, has received the contract for the erection of a four-story factory, 100 x 100 ft., to be built on River street, by Hall, Hartwell & Co.

The Schmeer's Paper Box Company, Syracuse, N. Y., is building a factory, 50 x 100 ft.

The Public Service Commission, Second District, has authorized the Orange County Lighting Company, Middletown, N. Y., to issue \$73,400 of bonds for additions and improvements to its lighting system.

The Poughkeepsie Foundry & Machine Company, Poughkeepsie, N. Y., iron founder and machinist, is making minor additions to its plant.

W. E. Sexton, Mineola, N. Y., has completed plans for a one-story pumping station, 48 x 55 ft., for the board of trustees, Riverhead, L. I., to cost \$100,000.

The pumping station of the Mt. Morris Water Company, Mt. Morris, N. Y., was destroyed by fire April 25 and the pumping machinery entirely ruined. Work is under way on the new pumping station, for which the company had completed plans some time since.

The sewer commissioners, Brighton, N. Y., will receive bids until May 12 for disposal plant, etc.

## New England

BOSTON, MASS., April 28, 1914.

It is difficult to analyze the situation from the standpoint of the machinery trade. Men are not communicative as to the good things which come to them, speaking more freely of unfavorable circumstances. Inquiry of those in attendance at the conventions of the National Metal Trades Association and the National Machine Tool Builders' Association last week developed the undoubted fact that business is somewhat better than it has been. This information came both from the manufacturers and the dealers. Conditions are not yet good, but there is some improvement. Orders are more numerous and from a greater variety of industries. The Connecticut manufacturing stocks quoted on the Hartford Stock Exchange are reported in active demand, with a tendency upward.

The Union Twist Drill Company, Athol, Mass., is preparing plans for two additional buildings at Athol—one 60 x 120 ft., three stories; the other 25 x 100 ft., one story—and two buildings to be erected at Derby Line, Vt.—one 60 x 180 ft., three stories; the other 80 x 137 ft., one story. All the structures will be of brick and concrete with steel sash.

The Merrow Machine Company, Hartford, Conn., manufacturer of textile machinery, will build an addition, three stories, with some 2000 sq. ft. to each floor.

A lighting plant will be erected at East Norwalk, Conn., at a cost of \$25,000, by a committee of which Arthur Waldron is the chairman.

Work has started on the addition which the Malleable Iron Fittings Company will build at Branford, Conn. The building will be 68 x 265 ft., four stories, of brick, steel and concrete.

The American Chain Company, Bridgeport, Conn., is preparing plans for an addition to the large plant recently occupied. It will be 30 x 100 ft., two and three stories, of brick, steel and reinforced concrete.

The Johns-Pratt Company, Hartford, Conn., manufacturer of electrical specialties, has increased its capital stock from \$300,000 to \$450,000, the proceeds to be devoted to meet the expense of the recent purchase of a large block of the stock of the Hart & Hegeman Mfg. Company.

The Buchanan Bolt & Nut Company, Holyoke, Mass., will build an addition, 26 x 57 ft., two stories.

Additions to general manufacturing facilities in New England include the following: Electric Cable Mfg. Company, Bridgeport, Conn., addition to cost \$25,000; Lyman Mills, Holyoke, Mass., addition 60 x 236 ft., three and eight stories; Taconic Mill, Pittsfield, Mass., addition 20 x 80 ft.; Willimantic Development Company, Willimantic, Conn., building to be occupied by the S. C. S. Box Company.

The engineering department of the Warner Brothers Company, Bridgeport, Conn., has brought out the Warner silent tilting tumbling barrel, No. 2, designed for the grinding and polishing of small stampings, forgings and castings. The barrels are polygonal in form and of cast iron, brass or wood, and are adjustable for running at the desired angle. The drive is by worm and gear, running in oil, from a single pulley equipped with an internal expanding friction clutch, operated from the same side of the machine as the tilting crank. The driving mechanism is inclosed to minimize the risk of accident.

It is stated that improvements are being planned for the water system in the city of Waltham, Mass.

## Philadelphia

PHILADELPHIA, PA., April 27, 1914.

The Williamsport School District, Williamsport, Pa., is contemplating the installation of the following machine tools in the manual training department of the public schools of that city:

One planer.  
One 12-in. x 6-ft. lathe.  
One drill press.  
One emery tool grinder.  
One shaper.  
Five 12-in. x 5-ft. lathes.  
One milling machine.  
One 10-in. speed lathe.

Four forges, one power hack saw, eight vises, one blower and machinists' and blacksmiths' small tools will be wanted also. Catalogues, photographs and circulars should be sent in triplicate to the secretary of the Williamsport School District. The selection of machines will be made and sealed bids advertised for later in the season.

The Eynon-Evans Mfg. Company, Philadelphia, Pa., is making additions to its foundry at an estimated cost of \$4000.

The Marietta Hollow Ware Company, Marietta, Pa., is building a foundry, 112 x 120 ft., one story, and other structures to increase its manufacturing facilities.

The Waynesboro Metal & Foundry Company, Waynesboro, Pa., manufacturer of brass and bronze castings, etc., is building a foundry, 60 x 130 ft., to take care of increased business.

The Harlan & Hollingsworth Corporation, Wilmington, Del., ship and car builder, is erecting a steel and concrete factory, 180 x 410 ft. It will be equipped throughout with machinery for hull construction. The details of machinery requirements are incomplete, but will consist of punching, shearing, planing and drilling machines.



The Wood Mfg. Company, Camden, N. J., is building a factory, 53 x 123 ft., two stories and basement. A gas engine is among the requirements. Electric drive will be used.

The MacAndrews & Forbes Company, Camden, N. J., manufacturer of wall board, is building several manufacturing structures as follows: One brick building, 81 x 87 ft.; one brick building, 52 x 55 ft., and one corrugated iron building, 55 x 158 ft.

## Chicago

CHICAGO, ILL., April 27, 1914.

The comment appearing in this correspondence last week to the effect that a slight betterment is to be noted in the machinery trade as the result of equipment buying for new and enlarged industrial plants, a situation which normally recurs in the spring, is borne out by the facts at a number of machine-tool makers' plants. In several instances additional men are being hired and in a number of cases new orders in April are running noticeably heavier than in March. There is, however, a lack of confidence in the permanency of this improvement and when the best is said of it business still remains sporadic and attended by unprofitable prices. The purchase of the plant of the J. Thompson's Sons Company is interesting in the promise of its enlargement in the near future and of its aggressive operation. The Giddings & Lewis Mfg. Company, Fond du Lac, Wis., has recently installed a number of machines as a basis for manufacturing a new type of turret lathe. Plans are now in process of preparation for the Pullman school and include two shops, each 50 x 100 ft., and one-story power and engine houses.

The Griffin Wheel Company, Chicago, is buying a number of tools for its new Los Angeles plant. The machine shop of this plant is not a manufacturing shop but the equipment required includes a Bullard vertical turret lathe, hydraulic wheel press, radial drill, boring mill, lathe, and auxiliary tools with drive.

The Goldsmith Brothers Smelting & Refining Company, 5826 Throop street, Chicago, has taken out a building permit for a factory, two stories, 40 x 60 ft., to cost \$10,000.

The Lott Mine Equipment Company, Chicago, has been organized with a capital stock of \$15,000 to manufacture mining machinery. The incorporators are F. H. Lochner, 3009 Warren avenue; H. A. Gardner and A. T. Carton.

The American Tool & Specialty Company, Chicago, has been incorporated with a capital of \$25,000 by M. A. Hoyt, A. R. Barry and R. H. Liedtke. The company may be addressed in care of the latter, 708 Wellington avenue.

The Modern Iron Works, Quincy, Ill., suffered a loss estimated at \$12,000 as the result of a fire which destroyed the foundry department. The machine shop was only slightly damaged.

The Dayton Cycle Car Company, Joliet, Ill., has made arrangements to occupy a plant on McDonough street and expects to be equipped by June for operations on a scale necessitating the employment of 100 men.

The Kewanee Iron & Metal Works, Kewanee, Ill., scrap iron dealer, has acquired a new and larger yard and will install scrap manufacturing machinery as well as an acetylene welding and cutting plant.

The Preble Machine Company, near Hammond, Ill., suffered a loss estimated at \$75,000 by reason of a fire, April 22, which destroyed the major portion of the plant. Reconstruction will be undertaken at once.

The plant of the J. Thompson's Sons Company, South Beloit, Ill., was purchased at receiver's sale by E. M. Kenyon, manager of the Dodge Mfg. Company, Mishawaka, Ind., for his personal account. He plans to enlarge the present plant in the near future and add considerable equipment.

The town of Nickerson, Kan., has voted \$26,000 of bonds for the construction of water works.

The courts have declared the recent election of the city of Pratt, Kan., to be legal, and steps will be taken at once to construct the contemplated municipal lighting plant, at an estimated cost of \$50,000.

The Curtis Brothers Handle Mfg. Company is moving its plant to McGregor, Iowa, where larger facilities are available. All machinery in the new plant is to be electrically driven.

The Illinois Traction Company, with principal offices in the McCormick Building, Chicago, is preparing plans for a central heating system to be built in Des Moines, Iowa, at a cost of \$500,000.

W. M. Thomson, clerk, Stanwood, Iowa, will receive bids until May 5, for the installation of a water works system, to cost \$9000.

## Indianapolis

INDIANAPOLIS, IND., April 27, 1914.

The Taylor-Evans Embossing Machine Company, Indianapolis, has been incorporated with \$50,000 capital stock, to manufacture embossing machines. The directors are H. F. Taylor, A. B. Evans and C. H. Howland-Shearman.

The Lebanon Foundry Company, Lebanon, Ind., has dissolved.

The Boston Mfg. Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture locks and other hardware. The directors are E. E. Dougherty, U. B. Boston and A. K. Stauffer.

The A. J. Thompson Stone Company, Ellettsville, Ind., has been incorporated with \$200,000 capital stock, to operate stone mills. The directors are A. J. Thompson, H. K. Thompson and W. C. Reeves.

Page & Joyce have sold the Chicago Sewer Pipe Works, Brazil, Ind., to William J. Gilbert, Mecca, Ind. The consideration was \$65,000.

The Liberal Stone & Brick Company, Anderson, Ind., has been incorporated with \$500,000 capital stock, to manufacture brick and stone. The directors are B. F. Lambert, J. T. Sears and A. H. Jones.

The Engman-Matthews Range Company, South Bend, Ind., has increased its capital stock from \$200,000 to \$300,000.

## Detroit

DETROIT, MICH., April 27, 1914.

The local machinery market does not exhibit any considerable degree of activity. Sales are light in standard tool lines and while inquiries are a little heavier they are still below normal for this time of year. The automobile industry has been a very sparing purchaser of machinery this spring and this condition has affected the local market considerably. The requirements of general manufacturers have been about as usual. Electrical apparatus is in good demand and there is greater activity in market for handling equipment. Foundries are operating at 50 to 60 per cent. of capacity except those doing contract work for automobile plants, which are somewhat better off. The week's report from architects and builders is featureless.

The George T. Wallace Sales Company, 301 Penobscot Building, Detroit, has opened a warehouse to carry lines of concrete mixers, gasoline engines, small derricks, pumps, etc., and which will be fitted to make immediate repairs or furnish necessary parts.

The Joseph Mack Printing Company, Detroit, will erect a five-story reinforced concrete building, 100 x 120 ft., for its use.

The Holihan Mfg. Company, 1506 West Fort street, Detroit, which recently took over the plant formerly occupied by the Anguish Mfg. Company, for use in the manufacture of gasoline tanks, radiators, hoods, fenders and stampings, has outgrown its capacity and will soon look for additional quarters.

The Columbia Western Mills, Saginaw, Mich., manufacturer of shade rollers, is enlarging its industry by the removal to the Saginaw factory of the Bay City branch of the same concern. Work in connection with this removal will be completed next week and the operation of the factory resumed.

The Parker-Spencer Company, Howell, Mich., has dissolved partnership, H. P. Spencer having purchased the interests of A. J. Parker. Mr. Spencer will add

more machinery and manufacture the goods of the Howell Machinery Company under contract.

The Fenn Mfg. Company, Charlotte, Mich., manufacturer of scythe snaths and post hole augers, is negotiating with the Owosso Improvement Association relative to moving its plant to Owosso. The company will establish a sawmill in that city also if it locates there.

The Oxygen Decarbonizer Company, Albion, Mich., has been organized with a capital of \$10,000 to manufacture apparatus for removing carbon from motor cylinders. Arthur Noble, Harry Richards and J. A. Rathbone, of Albion, and J. Walter Drake, Ned Denby and C. D. Hastings, of Detroit, are among those interested.

Announcement has been made that the American Malleable Company, a branch of the American Brake Shoe & Foundry Company, will occupy the plant recently vacated by the Reliance Motor Truck Company, at Pontiac, Mich. The company manufactures auto parts and miscellaneous supplies, and it will enlarge the old factory and erect more buildings. Work has already been commenced.

The J. H. Weir Sign Company, Benton Harbor, Mich., has been incorporated to manufacture electric signs. It is capitalized at \$20,000.

The Fenton Cyclecar Company, Fenton, Mich., which was organized a few months ago, has been reorganized with Henry S. Koppin, who formerly owned and operated the A. J. Phillips plant, at the head. Floor space has been secured in the Koppin plant for the manufacture of the cars.

The Lakey Foundry & Machine Company, Muskegon, Mich., has been incorporated with a capital stock of \$60,000.

The Flagler Cyclecar Company, Cheboygan, Mich., has been incorporated with a capitalization of \$150,000. E. S. Flagler is president; A. M. Gerow, vice-president; Ward Hagadorn, secretary and treasurer.

The Valley City Milling Company, Grand Rapids, Mich., will start work this month on the construction of a new plant which will double its capacity. New machinery of the best type will be installed, including automatic packing and weighing scales.

The Hayes Ionia Body Company, Ionia, Mich., has started a \$20,000 addition to its plant and will put in new equipment. The new factory will be ready June 15.

The capital stock of the Copeman Electric Stove Company, Flint, Mich., has been increased from \$200,000 to \$300,000.

## Cleveland

CLEVELAND, OHIO, April 27, 1914.

Conditions in the machinery market appear to be more unsatisfactory than they have been for some time. Early in the month there was an improvement in the demand, but this change for the better was short lived and the market is now duller than before. Since the first of the year there had been a steady and moderate demand for single tools, but single tool orders have now fallen off materially. Shops are withholding orders for equipment that they can manage to get along without. Makers of turret lathes report a fair volume of business. General conditions are not seriously affecting building operations outside of factory construction, and there is a good demand for heating and ventilating equipment.

The Faerberhill Mfg. Company, Cleveland, has been organized with a capital stock of \$10,000 to place on the market a machine for bundling cement and plaster sacks. The company, of which John Hillenbrand is manager, has opened an office in the Columbia Building. For the present it will have its machines made outside, but it plans eventually to establish a factory of its own.

The Massillon Electric & Gas Company, Massillon, Ohio, will enlarge its factory to three times its present capacity in order to supply electrical current for the new steel plant of the Massillon Rolling Mill Company and other industries. It is proposed to install two new turbo-generators, one of 1500 kw. capacity and another of 2000 to 3000 kw. capacity, two 650-hp. boilers, superheaters, condensers, etc.

The Gum Products Company, Troy, has been incorporated with a capital stock of \$25,000 and has purchased the plant of the Pioneer Pole & Shaft Company. It will make rubber products.

The city of Akron, Ohio, will receive bids May 15 for equipment for a garbage disposal plant.

The Selas Company, New York, has effected an agreement with the Canton Chamber of Commerce by the terms of which the company will move from New York and locate in a building in the Aultman group on Market avenue, Canton. This, however, will be used only as temporary quarters. The company, which has a capital stock of \$100,000, has been donated a four-acre site on which it will erect a factory building, 100 x 300 ft. It manufactures a patent air and gas mixer for lighting and heating apparatus. Eric Dankelmann is president and treasurer, and Robert Boettger, secretary.

The Girard Machine & Repair Company, Girard, Ohio, has been formed to engage in general machine and repair work and to manufacture novelties. The proprietors are Fred Wilson, D. L. Evans and Thomas Williams.

The Metal Post & Culvert Company, Niles, Ohio, has been organized with a capital stock of \$20,000 and will establish a plant adjoining that of the De Forest Sheet & Tin Plate Company. W. R. Thomas, sales manager of the De Forest Company, will be president, and E. D. Thomas, vice-president and secretary.

The city of Kent, Ohio, will construct a sewage disposal plant and system, at an estimated cost of \$140,000. R. T. Bailey is the engineer.

## Cincinnati

CINCINNATI, OHIO, April 27, 1914.

Considerable speculation is heard in manufacturing circles as to the probable effect the impending Mexican war will have on business. The general opinion is that nearly all lines will be stimulated, at least for a few months. At the moment business is quiet, although a few orders for lathes and shapers were reported last week, most of which came from domestic customers. The export trade does not appear to be improving, although this is the season for it to show some revival. Second-hand machinery of all kinds is dull. Electrical equipment continues in fair demand, but woodworking machinery is not now so encouraging. There is no change with the jobbing foundries, and 50 per cent. of capacity is probably a high average of activity, taking them all into consideration.

Work on the large warehouse for the International Harvester Company, on Eggleston avenue, Cincinnati, has been commenced. It will be five stories and of reinforced concrete construction. Roos & Co. are the contractors.

The large addition to the plant of the United States Can Company, Norwood station, Cincinnati, Ohio, recently mentioned, will be supplemented by a solder building that will be 22 x 24 ft., one story and of mill construction. B. L. Baldwin & Co., Cincinnati, are the architects in charge of the plans.

The Andrew Nessner Company, Cincinnati, brass founder, is having plans made for remodeling its foundry on Patterson street. Very little new equipment will be required.

The Stewart Iron Works Company, Covington, Ky., has been incorporated with \$1,000,000 capital stock by R. S., R. C. and Charles T. Stewart. No additions to the company's present plant are planned.

Albert Bess, Hamilton, Ohio, is in the market for a 30-hp. horizontal boiler and a 15-hp. horizontal engine.

It is rumored that William Rigling, Hamilton, Ohio, is planning to erect a factory building on Hanover street, to be used for the manufacture of household and hardware specialties. No details are yet available.

The Mitchell Wheel Company, Miamisburg, Ohio, whose fire loss was recently mentioned, has plans under way for rebuilding its hub and spoke department that were destroyed.

The Concrete Steel Construction Company, Dayton, Ohio, has commenced work on a new plant on Taylor

street, to be approximately 80 x 120 ft., one story. Nothing is known as to equipment needed.

The Doty Mfg. Company, Dayton, Ohio, manufacturer of vacuum sweepers, is building a factory, 80 x 140 ft., six stories.

The Barbeau Grain Hulling Machine Company, Dayton, Ohio, is reported to have plans under way for the erection of a plant to manufacture agricultural specialties. The company at present is operating in leased quarters. Information may be obtained from C. J. Barbeau.

Officials of the Baltimore & Ohio Railroad Company deny the published report that the repair shops at Chillicothe, Ohio, would be removed to another point.

L. W. Gelcher & Son, Bellaire, Ohio, have leased an idle foundry at Freeport, Ohio, that will be refitted at an early date.

The Aurora Coffin Company, Aurora, Ind., has commissioned Martin Fisher, architect, Cincinnati, to draw plans for an addition to its plant, 50 x 150 ft., three stories, and of regular mill construction.

## The Central South

LOUISVILLE, Ky., April 27, 1914.

With only a few large orders in sight, the machinery market in this section is not marked by much activity. However, it is not far below normal, and manufacturers believe conditions will improve shortly, despite the present lack of inquiries. The machine-tool market is only fair. Very little activity is reported in heavier electrical equipment. Boilers are moving chiefly in smaller sizes, and orders now being booked are from territory close to Louisville. Farm engines continue to be in rather good demand in the smaller sizes.

The James Clark, Jr., Electric Company, Louisville, is now engaged in shipping a general line of electrical machine tools to be used in equipping the United States repair ship Melville, now under construction at Norfolk. It will be a floating machine shop for the United States navy.

The analysis of the power requirements of the Louisville plant of the American Oak Leather Company has been completed by Ward Baldwin, Cincinnati, Ohio. The company will purchase two generators of 250 hp., one of 50 hp. and 30 motors of corresponding power. Bids for the equipment, installed, are now being received, although the company had originally intended to place the equipment with its own forces. Bids are being received both by Ward Baldwin and by B. M. Henry, manager of the Louisville plant.

John Rohrman, American National Bank Building, Louisville, is now in the market for the equipment for his factory, which was noted recently as projected. The capacity of the power plant will probably be about 100 hp. Motors and metal-working equipment will be bought.

The Gault Gas Burner Company, Louisville, which recently incorporated with a capitalization of \$115,000, is reported to be planning to equip a factory with metal-working machinery. James B. White, Louisville, should be addressed.

Motors will probably be purchased by Henry Elmers & Sons, bakers, Twenty-sixth and Market streets, Louisville, who are contemplating operating by electric power.

The Commercial Auto Company, Lexington, Ky., has increased its capitalization from \$12,000 to \$25,000 and will purchase additional repair equipment.

The Chesapeake & Ohio Railway is reported to be planning to enlarge its shops at Russell, Ky. M. J. Caples, fourth vice-president, Richmond, Va., is in charge.

The Self-Lock Gate Company, Sturgis, Ky., will purchase wood-working equipment for the manufacture of furniture, in addition to the lines it is now making.

James Hinkle, Barbourville, Ky., will establish a garage, for which he will purchase repair equipment.

The Phoenix Motor Car Company, Lexington, Ky., will erect a garage, 48 x 160 ft., for which machine tools will be bought.

The Clearfield Heading Company, Clearfield, Ky., has bought the Leon Stave Company's mill and will en-

large it for the manufacture of nail kegs, barrel heading and keg staves.

David M. Bright, of New York, will establish laundries operated by electric power at Nashville and Chattanooga, Tenn. The Nashville plant will cost \$150,000 and the Chattanooga laundry will probably be a little larger.

A. T. Holzbog, Chattanooga, Tenn., president of the recently organized American Hame & Singletree Company, 618-620 Sidney street, is purchasing power and special equipment for the factory. It will be electrically operated and will require about 150 hp.

Plans are being made for the construction of a hydro-electric plant near Rogersville, Tenn. J. R. Sanders, Persia, Tenn., is interested.

The Sulphur Springs Lumber Company, Bristol, Tenn., is purchasing equipment for a sawmill. An eight-mile tramroad, with electric motors, is also to be built.

The Tennessee Valley Water Company, Chattanooga, Tenn., has been recently incorporated with \$100,000 capitalization by J. W. Adams, and others.

Russee & Burgess, Memphis, Tenn., are purchasing equipment to replace their sawmill, which recently burned.

The Call Machine & Supply Company, Pikeville, Ky., will receive bids until June 10 for the installation of sheet metal machinery, drills, lathes, etc.

The Hazard Wholesale Baking & Supply Company, Hazard, Ky., will receive bids until May 30 for the installation of mixers, scales, wrapping machinery, etc.

## St. Louis

ST. LOUIS, Mo., April 27, 1914.

No evidence accrues of fundamental weakness in the machine tool market, through a similar condition in industrial affairs, but, nevertheless, there is no business. Investigation shows no buying aptitude; but it does disclose the fact that practically all interests are waiting for business. Reports from the agricultural sections are that the crop conditions for this season are above normal. All this leads dealers to feel that once there is a start in business the conditions will make for a broad activity.

The equipment required by the Hammer Brothers White Lead Company, St. Louis, for its plant in East St. Louis, Ill., recently destroyed by fire, will aggregate about \$75,000, it is stated.

The Reardon Glue Company, St. Louis, recently reported incorporated with a capital stock of \$10,000 by James A. Reardon, and others, will install mixing and grinding machines with a capacity of 4000 lb. glue and 12,000 lb. cold water paint daily.

The mill of the Koerner Lumber Company, 3628 South Broadway, St. Louis, burned with a loss of \$30,000 on equipment, will be re-equipped at once, according to reports.

The Johansen Brothers Shoe Company, St. Louis, is building a large addition to its plant, doubling its capacity.

The American Steam Laundry, St. Louis, will at once construct an addition practically doubling its capacity and will install further equipment shortly.

The plant of the Independent Lumber Company, St. Louis, which was destroyed by fire April 17, will be replaced. The loss is \$50,000.

The Best-Clymer Mfg. Company, St. Louis, operating preserving plants, has increased its capital stock to \$250,000 for the purpose of extending its factories.

The Varner Furniture Company, St. Joseph, Mo., will build a factory 80 x 240 ft., two stories, of brick and tile construction, at an estimated cost of \$28,000. The company has increased its capital from \$60,000 to \$80,000. H. C. Varner is president.

The Bernie Mill & Gin Company, Bernie, Mo., has been incorporated with a capital stock of \$12,500 by H. F. Sadler, J. T. Jones and L. L. Higginbotham, and will equip a cotton ginners.

The W. J. Frank Mfg. Company, Webster Groves, Mo., has been incorporated to manufacture sheet metal specialties, with a capital of \$15,000. The organizers



of the company are W. J. Frank, P. F. Frank, Edward Luft and others.

The Electric Light & Power Company, Sullivan, Mo., has been incorporated with a capital stock of \$25,000 by Richard Zinkmann, and others, and will build a public service plant.

The Stephens Gas-Electric Chandelier Company, Kansas City, Mo., has been incorporated with a capital stock of \$20,000 by S. S. Stephens, W. C. Chapman and E. G. Stephens, to manufacture lighting fixtures.

The Knobnoster Brick, Tile, Light & Power Company, Knobnoster, Mo., has been incorporated with a capital stock of \$40,000 by C. A. Harrison, Charles D. Middleton and J. B. Quinlan.

The H. L. & S. Mining Company, Lawton, Mo., will install electric drive throughout its plant.

The Glasgow Pure Ice & Supply Company, Glasgow, Mo., recently reported incorporated, will install an ice plant of 10-tons daily capacity.

A plant to cost about \$75,000, for the manufacture of a frogless switch, will be equipped at East St. Louis, Ill., by J. W. Walls, president of the Walls Frogless Switch Company, Pueblo, Colo.

The Alton Steel Company, Alton, Ill., has increased its capital stock from \$600,000 to \$950,000 for the purpose of increasing its capacity, as originally planned when the first units were put in operation.

The Illinois Mfg. & Supply Company, Quincy, Ill., has been incorporated with a capital stock of \$15,000 by Oscar E. Grimm, and others, and will equip a factory.

The Hoerr-Adams Shoe Company, Belleville, Ill., has begun work on a factory building and will be in the market shortly for equipment, including power plant, etc.

An electric light and power plant will be installed by the Renner Mill Company, Snyder, Ark.

The Danville electric light plant has been leased by W. W. Winters, Danville, Ark., who will add to its equipment and establish other plants in near-by towns.

The water and light commissioners, Jonesboro, Ark., will enlarge the power plant and install a switchboard and one 500-kw. generator.

A large sawmill at Boynton, Ark., will be equipped by the Boynton Land & Lumber Company, Syndicate Trust Building, St. Louis, Mo.

A sawmill to cut furniture and wagon timber will be installed by J. F. Light, Calico Rock, Ark., who is reported in the market for equipment to handle ash and hickory.

The Hindman Brothers Mill Company, Chidester, Ark., recently incorporated with \$15,000 capital, will install a hardwood plant with 25,000 ft. daily capacity. T. P. Best is president.

The rice mill of the Weiner Rice Mill Company, Harrisburg, Ark., recently burned with a loss of \$25,000, will be re-equipped at once.

The Cotton Plant Handle Company, Cotton Plant, Ark., manufacturer of hickory sledge handles, etc., has acquired the business and factory of the Cotton Plant Mfg. Company. R. P. Sallee, Rector, Ark., is in charge.

The Bromide Oolitic Stone Company, Bromide, Okla., is reported in the market for a crusher, pulverizer, planer and rubbing bed.

The Washington Oil Company, Skiatook, Okla., is in the market for power and drilling equipment, piping, etc. J. H. Craig is the engineer.

The city of Perry, Okla., has formally approved the expenditure of \$25,000 on a water works plant. J. G. Cronin is engineer in charge.

The city of New Cordele, Okla., will expend \$55,000 in water works plant extension, under the supervision of the Benham Engineering Company, Oklahoma City, Okla.

The city of Boswell, Okla., has voted a bond issue for the construction of water works. The mayor will supervise.

The Ramsay Springs Mineral Company, incorporated with \$20,000 capital stock by G. A. McHenry, McHenry, Miss., and George R. Burton, Talladega, Ala., will equip an electric light plant and an ice plant.

The Waynesboro Electrical Company, Waynesboro, Miss., will erect and equip a plant to develop 150 hp.

and requires generating and power equipment to cost about \$6000.

The Elk Lumber Company, Hub, Miss., has increased its capital stock to \$80,000 and removed its headquarters to Canton, Miss. It has plans for the increase of its mill equipment.

A plant for the manufacture of handles will be established at Lake Carrier, Miss., by J. H. Jackson.

The General Cooperage & Timber Company, New Orleans, La., has been incorporated with a capital stock of \$100,000 by H. B. and A. J. Carter and C. A. McQuay.

The Long Leaf Lumber Company, Shreveport, La., has been incorporated with a capital stock of \$100,000 by W. A. Robinson and others, to engage in the mill and lumber business.

The Cooper Lumber Company, Alexandria, La., of which James Cooper is president, will install an 8-ft. band saw-mill with an annual capacity of 10,000,000 ft.

The city of Melville, La., will equip a municipal electric plant to cost about \$15,000. L. J. Williams is mayor and Anderson Offutt, New Orleans, La., is the engineer.

The Electrical Utilities Exchange, 352 Bee Building, Omaha, Neb., is in the market for a pumping engine of 3,500,000 gal. daily capacity, 90 lb. steam pressure, 135 lb. water pressure.

## Milwaukee

MILWAUKEE, WIS., April 27, 1914.

Some concern is felt with regard to the Mexican trouble, particularly among mining machinery builders, but on the whole the situation is not yet so disheartening as might be expected, considering various other unfavorable causes existing for some time. Tool business is fair, but there is no uniformity, transactions being spotty and mostly for single tools. Spring expansion in various industries is requiring considerable small power units and electrical equipment. There is an excellent demand for reinforcing bars and builders' hardware, due to unusual activity in new construction. Collections are showing considerable improvement, which is taken as a good sign.

The John Lauson Mfg. Company, Chilton, Wis., manufacturer of gas engines, is preparing for the erection of a 75 x 120 ft. addition, part machine shop and part storage.

The Wausau Foundry & Machine Company, Wausau, Wis., is planning a reorganization on a larger scale to engage in the production of gasoline power feed mills, grinders, ensilage cutters, etc. Several demonstrating machines are in process of manufacture.

The Kahlenberg-Klaus Company, Two Rivers, Wis., awarded the contract for the erection of its chemical plant and machine shop, 60 x 100 ft., to Albert Tomcheck, Manitowoc, Wis. Equipment for producing chemical preparations for experimental engineering work will be purchased direct. Professor Louis Kahlenberg, University of Wisconsin college of engineering, and Alois Klaus are the owners.

A. Johnson, village president, Wittenberg, Wis., will receive bids until June 1, for sewer and water works, to cost about \$30,000.

C. W. Hale, Neenah, Wis., has established a small shop for general gas engineering practice and design.

The Line City Foundry Company, South Beloit, Wis., has been incorporated with a capital stock of \$18,000 by A. Balderson, George Bitzer and Daniel Broadhurst.

The municipal waterworks department at Monroe, Wis., will close bids April 29 for furnishing one steam-driven pumping engine operating under 80 lb. pressure with a capacity of 800 gal. per min.

The Lipman Air Appliance Company has been organized with a capital stock of \$100,000 by Carl E. Lipman, Beloit, Wis., to engage in the manufacture of a line of compressed air and air-compressing machines and devices manufactured for some time by the Lipman Mfg. Company, Beloit. Plans for enlarging the facilities and the equipment list are being prepared.

The Schaefer Mfg. Company, Berlin, Wis., is adding some tool equipment to take care of the demands by reason of the issue of a new portable woodworking mill

rig. The company manufactures concrete mixers, gasoline engines and milk condensery equipment.

The Harsh & Edmonds Shoe Company, Milwaukee, has awarded the contract for a seven-story addition, 80 x 160 ft., to cost \$95,000. The power plant will be enlarged. George R. Harsh is president.

The Woodford Engineering Company, Barton, Wis., is preparing for a large production of electrical hauling systems for quarries and mines, with central electrical control. Some equipment is being purchased, but the principal requirements are filled.

The DePere Civic Association, DePere, Wis., is attempting to raise \$50,000 for the purpose of meeting the conditions of the Milwaukee Cyclecar Company, Milwaukee, Wis., which desires to locate in DePere. If the negotiations are successful the former pea canning plant will be converted into a machine shop and equipped for cyclecar manufacture. C. A. Lawton is chairman of the promotion committee.

## Birmingham

BIRMINGHAM, ALA., April 27, 1914.

Outside of demands from rural merchants and inquiry for cotton-handling machinery the market continues dull. However, the Gulf States, so far as the agricultural sections are concerned, do not seem to feel the effects of the industrial depression, so that cotton gins, boilers and engines are in good demand. Small gasoline engines are selling well.

The Gray Iron Ore Company, Birmingham, intends shortly to issue \$75,000 of bonds for improvement purposes.

J. R. White, Hartselle, Ala., has secured a 30-year contract and will erect an electric lighting plant.

The city of Ozark, Ala., has voted \$25,000 of bonds for the improvement of its water works and electric lighting system. B. C. Dowling is superintendent.

The Interstate Oil & Fertilizer Company, Birmingham, Ala., will build oil mills and fertilizer mixing plants at Collinsville, Cullman and Odenville, Ala., at a cost of \$25,000 each.

The Alabama White Marble Company, Mobile, Ala., with a capital stock of \$200,000, has been incorporated by H. E. Baxter, J. R. Bishop, Leroy Bishop, and others, to engage in marble quarrying at Sylacauga, Ala.

C. W. Green, Jr., Augusta, Ga., will establish a crate manufacturing plant at a cost of \$40,000.

The J. S. Morton Lumber & Timber Company, Macon, Ga., has been chartered with a capital stock of \$200,000. A plant for the manufacture of hardwood lumber is to be established.

The Georgia Veneer & Packing Company, Brunswick, Ga., will extend its mill. J. L. Church is manager.

The Florida East Coast Railway Company will build railroad shops at Miami, Fla. The yards are to have a capacity of 1200 cars. L. C. Haines, 26 Broadway, New York City, is the purchasing agent.

Arguelles, Lopez & Brother, Tampa, Fla., are building an addition to their factory, and are about to start a second addition, 30 x 50 ft., three stories. J. W. Teasley & Co., Citizens Bank Building, Tampa, Fla., are the contractors.

Bonds to the amount of \$65,000 have been voted by the city of Allendale, S. C., for water, light and sewage.

## Texas

AUSTIN, TEXAS, April 25, 1914.

Machinery dealers in southern Texas report that trade has been affected somewhat by the Mexican trouble. Prospective improvements are being held up pending its settlement. Good rains have fallen over most of the State the last few days and crop prospects are favorable.

The Northern Texas Utilities Company, Dallas, which was recently organized with a capital stock of \$500,000, is having plans prepared for a number of electric power and lighting plants that it will erect in northern Texas. Plans also call for the construction of several water works, gas plants and ice factories.

The incorporators are J. P. Quirk, Minneapolis, Minn.; J. B. Round, New York City; J. J. Mueller, Chicago; Hiram Grosman and H. C. Woodlief, Dallas, and others.

A. J. Poirier, Dallas, has purchased a site and will construct a planing mill.

The municipal water works plant at Tucson, Ariz., will be enlarged.

The Oxygen Gas Company, Dallas, will construct a factory for the manufacture of oxygen gas.

The Smithville Water & Power Company, Smithville, will install new machinery.

John J. Hill, Smithville, will enlarge his ice factory and cold storage plant.

The San Angelo Ice & Power Company will install additional ice-making machinery.

The Interstate Electric Corporation of New York has acquired holdings of the Laredo Water Company, Laredo. The purchase price was \$253,000. The new owner will enlarge the water works and electric light plants.

J. J. Scott, Chicago, Ill., is preparing to construct a pumping plant and system of irrigation on the Pecos River, near Carlsbad, N. M.

The city commission of Dallas is having plans prepared for a large municipal sewage disposal plant.

The El Paso Electric Railway Company will enlarge its power plant at El Paso and install additional machinery.

## The Pacific Northwest

SEATTLE, WASH., April 21, 1914.

The Government machine shop on the Dalles-Celilo Canal, near The Dalles, Ore., was recently destroyed by fire, causing a loss of more than \$40,000. The plant will be rebuilt as soon as possible in order that the canal work may not be delayed.

The Hewitt-Lea-Funk Company, Cray Building, Seattle, recently leased 20 acres near Sumner, where it will erect a wood-working factory. About \$50,000 will be expended in buildings, exclusive of machinery. Work will be started at once.

The low bid submitted for construction of the addition to factory of the Broderick & Bascom Rope Company, Seattle, was that of the Pearson Construction Company at \$18,805.

The plant of the Pacific Glass Works, Georgetown, Wash., was recently destroyed by fire, entailing the loss of about \$35,000 to machinery and buildings. It is reported that the plant will be rebuilt during the year.

The Central Heating Company, North Yakima, Wash., which operates a steam heating system, is contemplating the construction of a new plant to cost about \$75,000. At the annual meeting of the stockholders held recently the matter was left to the board of trustees with power to act.

The Shull Lumber & Shingle Company, Everett, Wash., is having plans prepared for a very large shingle mill to be erected between Vancouver and New Westminster, B. C. It will be equipped at the outset with either 20 or 24 shingle machines. Work will begin during the month of May, according to H. A. Shull, the president.

J. H. Parker, Inc., Seattle, incorporated with a capital stock of \$50,000, plans the erection of a large saw mill, with shingle mill in connection. E. C. Million, Seattle, is interested.

The Ames Brothers Company, Seattle, has recently been incorporated with \$50,000 capital stock. It plans the erection of a folder-rack and cabinet factory. L. Waldo Ames and J. E. Corlett are the incorporators.

The Vashon Electric Company, Burton, Wash., has been formed, with a capital stock of \$75,000, and Homer H. Edwards, S. J. Linden and others are the incorporators.

The Salmon River Power & Light Company, Spokane, has been organized with C. L. McKenzie, of Colfax; H. H. Bloomer and Grant Smith, of Spokane; Edward Riggs and Ralph Irvin, of Salmon City, Idaho, as incorporators, and a capital stock of \$400,000. It is stated that it will erect a power plant near Spokane.

The properties of the Republic Light & Power Com-



pany, Republic, Wash., have been taken over by Z. E. Merrill and A. L. Capers, of that city. The new owners will make improvements, including the installation of a new engine and other machinery at the power plant.

The city of Tacoma will build a cold storage plant costing \$20,000 at its municipal dock. J. C. Corbin, Seattle, has been instructed to prepare plans.

The Astoria Flouring Mills Company, Astoria, Ore., has been incorporated with a capital stock of \$100,000. E. L. Smith, Edgar W. Smith and C. B. Stout are the incorporators.

The Kreider Lumber & Construction Company, Ketchikan, A. T., has been incorporated by Albert C. Kreider, Victor Johnstone and Axel Osberg, of Ketchikan. The capital stock is \$100,000. Plans for the erection of a large mill near Ketchikan are under consideration.

The Montana Marble & Tile Company, Great Falls, Mont., announces that it will erect a manufacturing plant at Fourth avenue south and Third street. W. A. Bugg is manager.

J. A. McLean, Walla Walla, Wash., has been awarded the contract for building the factory of the Walla Walla Self Oiling Wheel & Bearing Company, at a cost of \$12,000. Contract for the machinery has not yet been awarded.

Louis W. Hill, president Northern Railway, is authority for the statement that it will build a tie factory at Everett, Wash., this summer with a capacity of 200,000 ft. a day.

The Dempsey Lumber Company, Tacoma, will build a refuse burner costing \$10,000.

The Barker-Fairchild Company, North Yakima, Wash., is having plans prepared for the construction of a pre-cooling and cold storage plant.

The power plant of the Eastern Oregon & Power Company, of Baker, Ore., at South Baker, was recently completely destroyed by fire, involving a loss of about \$75,000. Officials of the company state that the plant will be immediately replaced.

W. T. Pickens, Central, Ore., has announced his intention of building a large sawmill.

The Spokane Valley Power Company, Spokane, Wash., has increased its capital stock from \$200,000 to \$2,000,000, the additional funds to be used in the development of a power site below Ft. Wright. The new plant will have a capacity of 20,000 hp. D. M. Drumheller, Spokane, is vice-president.

The town of Umatilla, Ore., is having plans prepared for a municipal water works, for which a \$20,000 bond issue was recently voted.

The Royal Basin Mining Company, Maxville, Mont., has announced its intention of establishing an electric power plant near Phillipsburg.

The Farmers Mill & Elevator Company, Hedgersville, Mont., will erect a 40,000-bushel elevator.

The Libby Lumber Company, Libby, Mont., according to Julius Neill, one of the owners, will establish a series of lumber mills and extend its operations into Canada.

Hunter B. Supplee, president Black Pine Mining Company, Elk City, Idaho, states that it will add five stamps to its mill, and erect a power plant on Red River capable of generating from 200 to 1000 hp.

## Western Canada

WINNIPEG, MAN., April 24, 1914.

The volume of business continues of moderate proportions, with the outlook still favorable. Considerable business is in prospect. Many cities and towns will use a good deal of machinery supplies in connection with municipal improvements. Reports indicate that there will be much expansion in the manufacturing industries this year, although it is not likely that the record of 1912 will be reached.

Sealed tenders will be received by A. A. Crawford, secretary of the town of Kamsack, Sask., until Wednesday, May 13, for the following works: Contract B, power house and filter house; contract G, furnishing and installing pumping machinery; contract H, furnishing and erecting boilers; contract J, furnishing and

erecting steam engine; contract K, furnishing and erecting generator. Alternative bids will be received for gas producers and engines of same capacity, in place of boilers and steam engine. Plans and specifications may be seen at the office of the engineers, Chipman & Power, Toronto, Ont., and Winnipeg, Man., and at the town hall, Kamsack, Sask.

S. C. Young, mayor of Ft. William, has announced that a company controlled by Chicago capitalists will erect a malleable casting plant in Ft. William.

The city councils of Ft. William and Port Arthur are negotiating with the representatives of a large gas producing corporation of Chicago with a view to installing a gas plant to serve the twin cities.

A report from Medicine Hat, Alta., states that Gilbert Hunt, Walla Walla, Wash., and associates, have signed a contract with the municipality of Dauntless, Alta., to build a factory for manufacturing threshing machines, feed grinders and other farm implements. It will represent an investment of \$750,000.

The J. H. Lavalley Company, Edmonton, Alta., is preparing to erect a paint grinding factory.

W. J. Milford & Co., Winnipeg, Man., contemplate establishing a box factory in Edmonton, Alta., to employ about 100 hands.

The Automatic Telephone Mfg. Company of Canada, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$1,000,000 by Hugh Phillips, C. S. A. Rogers, H. S. Scarth, and others.

The Brandon Shoe Company, Ltd., Brandon, Man., has been incorporated with a capital stock of \$100,000 by S. F. Lloyd, H. A. Wood, C. W. Hall, and others, to manufacture shoes, etc.

The MacDonald Brothers Sheet Metal & Roofing Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$20,000 by J. D. MacDonald, G. MacDonald, J. F. Waller, and others.

J. H. Early, and others, Saskatoon, Sask., will erect a cold storage plant.

The elevator of A. Forsythes & Co., High Bluff, Man., was completely destroyed by fire. The loss is estimated at \$40,000.

The plant of the Alberta Lumber Company, Vancouver, B. C., was totally destroyed by fire. The loss is estimated at \$150,000.

The North Burnaby Lumber Company, Ltd., Holden Block, Vancouver, B. C., is erecting a large sawmill.

Rogers & Windsor, Elko, B. C., are erecting a sawmill to have a daily capacity of 20,000 ft.

The Hunting-American Lumber Company, Ltd., Vancouver, B. C., is planning to erect a sawmill at a cost of about \$50,000.

The Smith Davidson Flour Mills & Elevator Company, Ltd., Ft. William, Ont., is preparing to erect a flour mill and elevator at Port Coquitlam, B. C.

The town of Swift Current, Sask., has been authorized to purchase a site for an electric lighting and power plant.

## Eastern Canada

TORONTO, ONT., April 25, 1914.

The grain elevator at Reaborough, Ont., owned by Thomas Skuce, was destroyed by fire, including the stock and machinery.

The Dominion Motor Car Company will build a plant at Coldbrook, N. B. It will assemble an English car.

The Maple Leaf Bedding Company, Ltd., Galt, Ont., has been formed to take over the bed manufacturing business formerly carried on by the Shurley-Dietrich Company, whose plant was recently destroyed by fire. A new factory will be erected to cost \$30,000. Roy Thorance is manager.

The ratepayers of Ingersoll, Ont., have passed a bylaw to grant a loan of \$15,000 to William & Short, manufacturers of automobile starters, who recently located there.

The Fireco Range Company, Ltd., Hespeler, Ont., has been incorporated with a capital stock of \$50,000 by O. Zard, A. W. Boos, J. B. Creig and others to manufacture stoves.



The Elora Furniture Company, Ltd., Elora, Ont., has been incorporated with a capital stock of \$40,000 by J. E. Walser, F. Daub, O. C. Schmidt and others to manufacture furniture.

The Munder Tungsten Lamp Company, Ltd., Guelph, Ont., has been incorporated with a capital stock of \$50,000 by J. S. Wheeler, J. E. Carter, J. Davidson and others, to manufacture lamps.

The Brantford Piano Case Company, Ltd., Brantford, Ont., has been incorporated with a capital stock of \$100,000 by M. S. Phelps, W. D. Schultz, J. Ruddy and others.

The Universal Tool Steel Company, Ltd., Toronto, has been incorporated with a capital stock of \$10,000,000 by Gerard Ruel, R. H. M. Temple, Archibald J. Reid and others to manufacture steel.

The Electric Furnace Products Company, Ltd., Toronto, has been incorporated with a capital stock of \$5,000,000 by Harris E. Wallace, Richard Pike, Arthur Christilaw and others to manufacture gas producing materials and machinery for the manufacture of such products.

The Dominion Engineering & Machinery Company, Ltd., Toronto, has been incorporated with a capital stock of \$2,000,000 by George M. Kelley, John D. Falconbridge, Alexander C. McFarlane and others to manufacture engines, machinery, etc.

The city architect's department, Toronto, has issued a permit to the Ford Motor Company for the erection of a five-story reinforced concrete factory and shop extension to cost \$160,000.

The Watson Cyclecar Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of \$100,000 by S. A. Watson, E. Knox, C. Inrig and others.

The Montreal Arena Company, Montreal, has increased its capital stock from \$35,000 to \$150,000, and will install an ice-making plant.

The ratepayers of Niagara Falls, Ont., have passed a bylaw to grant \$12,000 to purchase a site for the Dominion Chain Company. The company will erect a \$95,000 plant and will install \$90,000 worth of machinery.

Page & Shaw, Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by Robert Taschereau, T. Rinfret, J. E. Short, and others, to manufacture cartons, boxes, etc.

The Maple Leaf Lumber Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by E. F. McDonald, J. M. Adam, A. C. Rutherford, and others, to manufacture lumber, etc.

The Kel-Kee Cyclecar Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by J. J. MacLennan, J. N. Black, A. Adams, and others, to manufacture power propelled vehicles, etc.

The Canadian Niagara Linens, Ltd., Niagara Falls, Ont., has been incorporated with a capital stock of \$300,000 by E. Duggan, and others, of Toronto, to manufacture linen and cotton goods, etc.

## Government Purchases

WASHINGTON, D. C., April 27, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until May 12, schedule 6696, for 18 vertical simplex pumps and spare parts for Norfolk; until May 19, schedule 6689, for two 20-hp. boilers complete for Portsmouth; schedule 6691, for one motor-driven band sawing machine, one motor-driven vertical mortiser and one motor-driven revolving oilstone and grinder for Brooklyn; schedule 6690, for four right and left 3-in. horizontal motor-driven centrifugal pumps for Philadelphia; schedule 6701, for miscellaneous No. 1 Morse taper and straight shank, right-hand end mills for Brooklyn; schedule 6714, for one horizontal single feed pump for Norfolk; until May 26, schedule 6705, for one disk grinder and roll sander for Annapolis; schedule 6706, for one motor-driven wet and dry grinder for Philadelphia; schedule 6710, for one 3000-lb. single frame guide ram forge hammer and one motor-driven bulldozer bending machine for Charlestown; schedule 6711, for one standard geared double cam brake, one 10-ft. quick-acting flanging clamp, one motor-driven wall type radial drill, two punching ma-

chines, one single end shearing machine, three sets of bending rolls and two motor-driven gate or squaring shears for Charlestown; until June 2, schedule 6687, for one 40-ton bridge crane with 5-ton auxiliary hoist and one 5-ton wall crane for Puget Sound.

Bids will be received by the Bureau of Yards and Docks, Navy Department, Washington, until May 23, for equipment for a heating plant at Mare Island comprising 30 70-hp. boilers, with oil burning furnaces; one fuel oil set, including pump, etc.

Bids will be received by the U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., until May 7, for furnishing 20 balanced valves, for the Arrow Rock dam, Boise project, Idaho; until May 11, for furnishing hydraulic apparatus for the Okanogan project, Wash.

Bids will be received by Major J. P. Jervey, U. S. Engineer's Office, Wheeling, W. Va., until May 13, for furnishing and installing power house machinery, etc., for dams Nos. 15 and 20, Ohio River.

Bids will be received by the purchasing officer, Panama Canal, Washington, until May 8, under circular 845, class 1, for 16 motors. This was previously mentioned under circular No. 802.

Bids were received at the bureau of supplies and accounts, Navy Department, Washington, on April 21 for furnishing material and supplies for the navy yards as follows:

### Schedule 6434, Steam Engineering

Class 66, Boston, Philadelphia, and Mare Island—Portable ventilating sets with spares—Bid 48, \$2271; 91, \$1618; 274, \$1668; 309, \$1742.50.

### Schedule 6566, Ordnance

Class, 92, Lake Denmark—Steam fire pump—Bid 30, \$600; 35, \$575; 54, \$2000, alt., and \$2026, alt.; 81, \$647.50; 113, \$587; 124, \$625; 256, \$615; 268, \$530; 308, \$628.

### Schedule 6568, Steam Engineering

Class 101, Norfolk—One 600-ampere welding equipment—Bid 52, \$4500; 35, \$3838; 188, \$2960, \$4118, and \$4000; 322, \$5210 and \$4750.

Bids were received by the purchasing officer of the Panama Canal, Washington, under circular 837, as follows:

Class 5—Three induction motors—Bid 35, \$1034, 100 days; 99, \$709.65, 90 days.

Class 8—33,000 ft. plow steel hoisting cable and 12,000 ft. plow steel cable—Bid 7, \$2312, 21 days; 13, except item 11, \$2192, 15 days; 78, \$1993.50, 30 days; 80, \$2580, 21 days; 83, \$2347.50, 40 days; 91, \$2916.60, 30 days.

Bids were received on April 22, under circular 841, as follows:

Class 15—12,000 ft. plow-steel hoisting cable—Bid 6, \$1560, shipment 7 days; 33, \$1470, 25 days; 35, \$1680, 21 days; 36, \$1548, 40 days.

Bids were received by the U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., April 8, under advertisement 284, for one turbine-driven centrifugal pump, for the North Platte project, as follows:

Bid 100, \$725, time 60 days, delivery Oakland, Cal.; bid 15, \$1167, time 63 days, delivery West Berkeley, Cal.; bid 98, \$1300, time 60 days, delivery San Francisco; bid 84, \$1357, time 50 days, delivery Harrisburg, Pa.; bid 12, \$1574, time 63 days, delivery Harrisburg.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

7. A. Baldwin & Co.
11. Blake & Knowles Steam Pump Works.
12. C. F. Brawn & Co.
13. Broderick & Bascom Rope Company.
14. Buffalo Steam Pump Company.
15. Byron Jackson Iron Works.
16. Camden Iron Works.
17. W. I. Cheney & Co.
18. C & C Electric & Mfg. Company.
19. Diehl Mfg. Company.
35. General Electric Company.
78. United States Steel Products Company.
80. Waterbury Company.
81. Dover Boiler Works.
83. Wire Products Importing Company.
84. Henry R. Worthington, Inc.
91. J. B. Kendall Company.
98. Krogh Mfg. Company.
99. Western Electric & Mfg. Company.
100. United Iron Works.
113. Fairbanks, Morse & Co.
124. Gardner Governor Company.
188. Manning, Maxwell & Moore.
256. Frank T. Simmons.
268. Scranton Pump Company.
274. B. F. Sturtevant Company.
308. Warren Steam Pump Company.
309. Western Electric Company.
322. Siemund-Wenzel Electric Welding Company.

## Trade Publications

**Double Plunger Hydraulic Pump.**—Defiance Machine Works, Defiance, Ohio. Folder. Mentions a double plunger type of hydraulic pump that was illustrated in *The Iron Age*, January 15, 1914. This pump is designed for use with hydraulic presses, where a pressure capacity of 5 to 100 tons is required. A description of the pump is given, the text being supplemented by a halftone engraving. A line of patent woodworking machinery is also mentioned.

**Foundry, Shop and Contractors' Equipment.**—Woham, Sanger & Bates, Inc., 30 Church street, New York City. Condensed catalogue. Furnishes descriptions and illustrations of some special equipment for industrial service. This includes locomotive cranes, industrial tracks, charging and dump cars, chain hoists, traveling cranes, sand and concrete mixers and special firebrick. In connection with the descriptions, brief lists are given of the sizes and capacities that can be supplied.

**Flexible Metal Hose.**—American Metal Hose Company, Waterbury, Conn. Four pamphlets. Describe a line of flexible metal hose and tubing for conveying oil and steam, inflating automobile tires and for automobile headlight connections. Illustrations of all four are given, together with brief descriptions.

**Electrical Supplies.**—Pettingell-Andrews Company, 156 Pearl street, Boston, Mass. Catalogue No. 15. Size, 7 x 10 1/4 in.; pages, 1143. Deals with an extensive line of electrical merchandise, including switches, cut-outs and panel boards, conduit and fittings, wires, lamps and accessories, street fixtures and posts, instruments and apparatus, appliances of various kinds, marine supplies, etc. All of these are illustrated and briefly described. A thumb index is used to render the finding of any particular line an easy matter, and in addition there is an alphabetical index for each section at the beginning. An index of trade numbers is given, and in addition there is a 41-page alphabetical index of the various lines listed.

**Disk Grinding Machine.**—Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill. Mailing card. Deals with a patternmakers' grinding machine which will handle all kinds of wood. An engraving of the machine in use in a railroad pattern shop is presented.

**Ventilating Fans.**—American Blower Company, Detroit, Mich. Bulletin No. 35, Series 1. Shows how the Pitot tube is employed for testing the delivery of ventilating fans. A number of illustrations and diagrams showing the use of the tube are given and directions for conducting the test are included.

**Valves and Fittings for Superheated Steam.**—McNab & Harlin Mfg. Co., 55 John street, New York City. Pamphlet. Contains a brief, illustrated description of an extra heavy flanged steel gate valve, for high pressure and superheated steam service. The changes made necessary in the design of valves and fittings by the increasing use of superheated steam are briefly touched upon and the average results of a series of physical tests of the material are included.

**Coal Handling Plants.**—Eastern Steel Company, Ltd., Halifax, N. S., Canada. Bulletin No. 1. Describes and illustrates a line of coal handling machinery including bucket elevators, rotary mine car tipples, picking and loading belts, car hauls, screening machinery, etc. For the most part the views of the equipment show it installed. A brief, illustrated description of the plant of the company is also included.

**Boiler Grate Bars.**—Marion Machine Foundry & Supply Company, Marion, Ind. Catalogue. Describes the Shear Klean grate, which is claimed to be an absolutely new departure in the line of boiler grates. Special attention is called to the sidewise shearing and crushing action of the grate. Every other bar is fitted with a roller, so that when the bar is rocked there is a fore and aft shaking motion which enables the operator to keep the fires clean at all times. Descriptions of the boiler room specialties manufactured by this firm are also included.

**Boilers, Feed Water Heaters and Engines.**—Bass Foundry & Machine Company, Ft. Wayne, Ind. Catalogue. Presents a brief description with numerous illustrations of a line of tubular boilers, feed water heaters and Corliss engines. In connection with the boilers a number of engravings are given of fittings, breechings and fronts, together with setting plans and dimension tables. Views are also given of various fixtures and grates. A table giving the power of the engines is included, together with a number of other tables of useful information.

**Motors and Generators.**—Fairbanks-Morse & Co., 90 South Wabash avenue, Chicago, Ill. Three bulletins. Nos. 27 and 29 give an illustrated description of a line of direct-current motors and generators, the former covering the smaller machines and the latter the larger ones. These are of the commutating pole type and can be secured in voltages of 115,

230 and 550 for the motors, and 110, 220 and 500 volts for the generators. The third bulletin, No. 210, relates to a line of internal starter motors, designed for use on two and three phase alternating-current circuits. These motors are controlled by the opening and closing of a line switch and the bulletin contains a number of engravings of them in use for driving elevators and metal working machinery. A description of the construction of the motors and the method of control is included.

**Valve, Service and Roadway Boxes.**—Central Foundry Company, 90 West street, New York City. Catalogue. Size, 3 1/2 x 6 1/4 in.; pages, 23. Covers a line of valve, service and roadway boxes for use in connection with water and gas mains. Illustrations of the various types of boxes are presented, with tables of the sizes in which they can be furnished, and mention is made of the different sizes or bases that can be supplied.

**Die Stocks.**—Hart Mfg. Company, Cleveland, Ohio. Pamphlet. Presents a brief description of a number of different types of die stocks for threading pipe from 1/4 to 6 in. in diameter. Illustrations of the stocks assembled and with the covers removed are given and the principal features are briefly touched upon.

**Reamers.**—Standard Tool Company, 6900 Central avenue, S. E., Cleveland, Ohio. Folder. Illustrates a line of reamers which are made in the shell, chucking, boiler, taper pin, expansion and adjustable types, brief descriptions of the different kinds being given below the engravings. Mention is also made of the other kinds of reamers which make up the complete line of the company and the cased sets of standard hand reamers that can be supplied.

**Pulverizing Machinery.**—Raymond Bros. Impact Pulverizer Company, 1315 North Branch street, Chicago, Ill. Relates to a line of pulverizing air separating machinery for use in a number of manufacturing processes. These machines will handle any kind of material at a marked saving in cost. An exterior view of the plant and one showing the interior of the machining and assembling room are presented.

**Bending Machines.**—Wiener Machinery Company, Hudson Terminal Building, New York City. Circular. Refers to the Hercules bending machine for bending angles, beams, channels, rails and other shapes and forming angle rings with the legs inward or outward without heating them. Illustrations and brief descriptions of the different sizes of machine are given, together with a table of specifications.

**Screw Plates.**—F. E. Wells & Son Company, Greenfield, Mass. Catalogue No. 7-A. Devoted to a line of screw plates which are made in sizes ranging from 3/16 to 1 in. Illustrations and specification tables of the different plates are given and mention is also made of adjustable die stocks and tap wrenches.

**Pneumatic Tools.**—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Circular U. Shows a number of pneumatic tools, including a roller bearing piston drill, which is made in several types, and a line of single valve chipping hammers. There is practically no text in the circular, which is made up almost entirely of halftone engravings and specification tables of the tools. Mention is made of a line of electric drills, which are equipped with universal motors.

**Induction Motor Starting Switches.**—Allen-Bradley Company, Milwaukee, Wis. Bulletin B-531, superseding the December, 1912, issue of the same bulletin. Contains a brief, illustrated description of the type G starting switch, designed for use with small alternating-current motors that can be connected directly to the line without a starting resistance to limit the current. These starters are of the drum type and are entirely inclosed in a dustproof case. A view of the starting switch in its cover, as well as engravings of the three different forms with the cover removed, is given.

**Roofing Cement.**—Pecora Paint Company, Philadelphia, Pa. Folder. Points out the advantages of Pecora Weather-tite, which is designed for repairing roofing of all kinds and can be employed for fastening sheet iron to structural work. Complete directions for the use of this paint are given, together with illustrations and brief descriptions of a number of tests that have been made.

**Feed Water Heater.**—Stewart Heater Company, Buffalo, N. Y. Circular A. Pertains to the Otis tubular feed water heater, oil separator and purifier. The special features that are guaranteed for the heater by the builder are briefly stated, and this is followed by a description of the heater with a table of dimensions. Either vertical or horizontal units can be supplied.

**Heating Press.**—Watson-Stillman Company, 190 Fulton street, New York City. Bulletin Aa. Concerned with a multiple plate design of heating press, which is intended especially for use in the finishing of silks, worsteds, etc. An illustration of the press, which has 16 or more intermediate heating plates, supplements a complete text description.

